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Hygienic Aspects of Pig Housing

A Review

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Many of the communal pig houses built in this country during the past 30 years or so have proved unsatisfactory as regards their effect on both health and productivity and, according to Davidson [4], "the principal troubles have been respiratory ailments, slow growth and inefficient utilisation of food." Such experiences have not been confined to this country for in Germany the massive stone houses built during the 50 years before the war caused serious damage to pig rearing (Steinke [23]) and it was a long time before the extent of the damage and its underlying causes were realised.

Detrimental Factors

Temperature Conditions.—In the opinion of many pig-keepers the main fault of many piggeries is that during cold weather the temperature drops to a level which is not only too low for the health and well-being of young pigs, but may even be too low for older animals including fattening pigs. According to Shanks [22], temperatures may fall as low as freezing point and variations of as much as 26° F. may occur within 24 hours in the modern piggery. Shanks ascribed bad effects on health to these factors and records that, when measures were taken to improve the temperature conditions, good results followed. Price and Ling [19] also found evidence of restlessness, chilling and slow gains in the large lofty type of building where no protection had been provided in the pens with straw hurdles and the like. They say it was difficult to maintain a suitable temperature in such houses in the winter and they met some pig-keepers who had resorted to artificial heating as a solution of the problem. Steinke attributes the bad effects of the modern communal piggery to cold conditions in the winter and sums up the position by saying "sufficient warmth is as important in the pig house as pure fresh air." It is interesting to compare this statement with a quotation by Bedford [2] in his discussion on the relation of warmth and ventilation to the human subject, "as Reid [20] remarked, heat is still more important to the human frame than fresh air." The statements of both Steinke and Bedford are made as the result of the analysis of a mass of evidence and it is interesting to contrast their conclusions with the opinion of Anthony [1] that while a loft over the modified Danish piggery helps to keep it warm, it adds to the difficulties of proper ventilation which he thinks of paramount importance. This emphasis on ventilation is one of the main factors contributing to the lack of warmth in the modern piggery during cold weather. Linton [12], saying that a pig, like all animals, requires plenty of fresh air, recommends an air flow of around 1,000 cubic feet per hour for a largish pig, and in order to avoid too frequent air changes he recommends up to 471 cubic feet of space per fattening pig. Such a large cubic space is another and even more important contributing factor to the low temperature in the modern piggery as the heat losses from the surfaces of a building are roughly proportional to the two-thirds power of its capacity, other things being equal.

Air Flow.—There appears to be no sound foundation for most recommendations in regard to air flow and cubic space in animal habitations and it is deplorable, therefore, that we should sacrifice reasonable temperature conditions in trying to attain the figures often suggested. Recommendations for air supply are based mainly on permissible carbon dioxide impurity although other arbitrary standards are sometimes recommended. Now, permissible carbon dioxide was a method used in devising standards for the ventilation of human dwellings, based originally on the relationship of carbon dioxide to disagreeable odours, and it has been found that different standards can be allowed for different social strata of the human population depending on such factors as cleanliness. There would seem to be little, if any, justification for translating such standards to animal houses. Deutch [9] found that there was no connection between carbon dioxide content, ammonia, and the air humidity; one might add that carbon dioxide obviously bears no direct relationship to temperature conditions.

The attractiveness of using the carbon dioxide content of the air in a building as a guide to the air supply required came from the fact that the amount in the atmosphere is relatively constant as also the amount excreted by an animal under resting conditions, so that, once a permissible standard of impurity has been arrived at, one can calculate the amount of air change necessary to maintain it. But the weakness of this simple and apparently precise method lies in the fact that conditions such as warmth and humidity, which are of much greater importance to animal health than carbon dioxide and body odours, vary from day to day in the external atmosphere to a much greater extent than the carbon dioxide. There is no validity, therefore, in the tacit assumption that if the carbon dioxide content of the air is maintained in a satisfactory state, other important factors are also likely to be satisfactory. It is interesting in this respect to note in a recent Report on Heating and Ventilation [11] the statement that the concentration of carbon dioxide is not sufficiently critical to provide a basis for fixing rates of ventilation.

Much of the published material on air supply determination for animal habitations is at best only pseudo-scientific, although the large figures for air flow arrived at have sometimes been defended on the grounds that one must supply large amounts of fresh air to dilute airborne infection. Such statements are usually made, however, without much consideration of the modes of airborne infection or their application to pig-disease problems. Although micro-organisms are discharged from the upper respiratory tract during coughing, etc., in droplets of varying size, the larger ones fall rapidly and are likely to be inhaled by a new host only if the distance between the animals is quite small. This type of "direct droplet infection" is not likely to be materially affected by ventilation, particularly in piggeries where the animals are usually in close proximity. Thus Waldman [25] found that to control piglet influenza it was necessary to have both pens and yards completely isolated. Smaller droplets from the respiratory tract lose water by evaporation and form droplet nuclei, which may remain airborne for some considerable time and travel considerable distances. This may lead to "direct airborne infection" and, while ventilation might be expected to have some limiting effect on it, this form of infection has never been shown to be of any special significance in the spread of pig diseases. Air may also carry infective agents reaching it in the form of infected dust particles, giving rise to "indirect airborne infection," and though ventilation may have some effect on this type of spread, the raising of dust by draughts or other factors would presumably be just as dangerous or even more so than restricted ventilation.

Cubic Space.—Theoretical determination of space allocation in animal buildings has usually been based on an air supply, calculated on some arbitrary standard as described above, together with an empirical assumption as to the number of air changes which can be permitted in an hour without detriment to the animals. Linton says it is believed that an animal can stand five changes per hour, but there would appear to be no sound reason for taking this as maximum figure. We know that human beings in certain industries and on board ship can stand changes at a rate of 20 to 30 per hour without bad effect. It is unlikely, therefore, that the general rate of air flow in an animal building would reach a dangerous level even in the relatively small cubic space allocations discussed later and even if the high levels of air flow per hour recommended by Linton and others were maintained. The only practical danger would appear to be from draughts, which are generally acknowledged to be dangerous, but draughts depend on factors other than the rate of air change. The baffling of doorways and inlet ventilators would do much more to prevent

draughts than increasing the space allocation. Moreover, one must also bear in mind that too large a piggery leads not only to cold conditions but also to an unnecessarily expensive building. There is no doubt that many of the figures recommended on the empirical theoretical grounds mentioned above have been ridiculously high and have been in a large measure responsible for many of the failures in the so-called hygienic piggeries. One must also take into account the fact that apart altogether from direct effects on health, such cold conditions have been found to increase food consumption, adding considerably to the costs of production[4].

Heat Conduction.—There is another factor of importance in the maintenance of warmth in buildings, *viz.*, the provision of adequate insulation, and in this again the pig-keeper has often been misled in the past, for, although some attention has been paid to the insulation of concrete floors, very little attempt has been made to insulate walls and roofs. The usual type of building recommended within recent years has been one of concrete or brick with some light type of open roof and a cement concrete floor. When one remembers that the combined surface area of the walls and roof of a building is much greater than that of the floor, one sees the necessity of these also being effectively insulated if excessive heat loss is to be avoided in cold weather. There are no technical difficulties in securing efficient insulation although considerable expense may be involved. According to Steinke, brick, sandstone, lime sandstone, cement and basalt are unsuitable materials for the construction of pig houses, because they are such good heat conductors, while various porous bricks and stones, certain kinds of cement and various earth mixtures are fairly suitable, but he claims that wood is superior to all other building materials. While this statement is of importance it should not be taken too literally. Wood is certainly a very good insulating material which is cheap, and a wall consisting of two layers of wood, with the space between filled with some home-produced insulating material, provides an excellent insulator at relatively low cost. But wood is difficult to disinfect and is apt to be eaten by the pigs, and the modern builder can produce good insulating effects using many other materals which are both durable and hygienic although possibly somewhat more expensive. It is certain that sufficient insulation can be obtained for houses containing relatively large numbers of store or fattening pigs using materials such as bricks if care is taken. It is a more difficult matter, however, to maintain warmth during cold weather in a pen housing a single sow about to farrow or with a very young litter. It has been shown by Mitchell and Kelley[14] that a sow's heat output is low around the time of farrowing, being only about half of that produced by a bacon pig of similar weight. The heat output of the litter is also low at this time. The position is further aggravated by the fact that the sow and litter must be given a reasonably large floor space if the little pigs are not to be crushed. This leads often to a relatively large building with high heat losses from its surface. The farrowing pen frequently recommended may have a floor space of 100 sq. ft., a volume of 800 cu. ft., and a surface area (walls, floor and roof) of about 520 sq. ft. and it can be shown that with such dimensions, even when the building is reasonably well constructed of brick with insulated floor and roof, the heat output of a sow and litter would only be sufficient to warm up the incoming air by about 5° F. With really efficient insulation the difference between inside and outside temperature might be raised to some 12° F. but even then the temperature of the house would still be too low in cold weather for newly farrowed pigs. It is obvious that it is highly desirable, therefore, to supply the sow and her young litter with an artificial source of heat during the first week after farrowing if the weather is cold. As the days pass after birth, while the heat production of the sow rises a little, that of the litter rises very rapidly so that by the end of the first week the combined heat output of the sow and litter has risen about 40 per cent. and by the end of the eighth week it has risen by 150 per cent.[14]. Thus about the end of the eighth week the temperature of the moderately well insulated building would be about 10° F. and that of a very efficiently insulated building about 30° F. higher than outside. By this time, therefore, in the latter case, when the outside temperature was at freezing point or slightly below, the inside temperature would be within what might be considered a reasonable range. A farrowing house should, therefore, be kept as small as possible, bearing in mind the danger of little pigs being crushed by the sow if it is too small. The best insulation economically possible should be used and in addition artificial heat should be provided during the first weeks after farrowing during cold weather.

The maintaining of adequate warmth in the housing of store and fattening pigs is a much simpler matter, because the cubic space allotted per pig need only be a fraction of that required by a sow and litter and also because a relatively large number of pigs can be housed together. The main benefit as regards warmth in connection with housing pigs in fairly large groups arises from the fact that the building surface area per head involved in heat loss when a large number of pigs is housed under one roof is very much smaller than when the animals are housed individually or in small numbers. For example, with 100 bacon pigs of 200 lb. body weight in a fairly well insulated brick building and where each pig is allowed 50 cubic feet of space (the amount recommended by Shanks) the temperature inside might quite well be 30° F. above that outside even with the air flows usually recommended. On the other hand, with Linton's recommendation of over 400 cubic feet of space per pig, the animals could only raise the temperature about 12° F. Even with very efficient insulation such a house would be cold in winter months and where the insulation is poor, as is so commonly the case in this country, the position is naturally very much worse.

Standards

Temperature.—We cannot recommend with any precision the optimum temperature for a piggery. Several workers, including Linton and Shanks, take the critical temperature of the pig, *viz.*, about 68° F., as being of value as a guide at least from the economic point of view. They maintain that if the temperature of the surroundings falls below this the pig's food for maintenance will increase. However, this has little bearing on practical conditions for the critical temperature is determined under fasting conditions and is consequently no adequate guide in the matter of choosing a suitable temperature for the environment of the commercial pig which produces much more heat. Price and Ling found detrimental effects due to low temperatures but they do not detail the precise temperatures involved. They recommend a uniform temperature of around 58° F. for a fattening house and 60° F. for the breeding house. Shanks maintains that sudden drops in temperature caused outbreaks of pneumonia and paratyphoid; he also found huddling, fighting and savaging where the houses were intensely cold. This writer again does not specify the exact temperatures involved when such effects were produced, but he does mention that the pigs were notoriously unhealthy on a farm where the temperature varied from 68° to 44° F. in 24 hours. After making many observations and studying pigs in a house with outside runs where the indoor temperature never fell below 62° F. and never rose above 85° F. Shanks concluded that such a house was "eminently satisfactory" and made the general recommendation that the temperature of a piggery should never fall below 60° F. and should preferably be in the region of 80° F. even for a fattening house. The National Veterinary Medical Association[15] recommended that the temperature in piggeries should not fall below 70° F. and the temperature of the nest for the young pigs should be 80° F. although they give no evidence in support of this contention. Moreover, 80° F. is probably about the top of the suitable range for the pig, because physiologists have noticed that at temperatures above 79° F. the physiological regulation of body temperature tends to be no longer sufficient.[8] Steinke recommends a temperature of 54° F. for a fattening house and 50° F. for a breeding house, figures based on the opinions of a large number of German pig keepers. According to Mitchell and Kelley "the physiological reactions at the lower temperature limits, coupled with practical observations, suggest the desirability of a temperature not lower than 50° to 55° F. for a farrowing house: somewhat lower temperatures are permissible for fattening hogs because of their higher plane of nutrition, but house temperatures approaching freezing should be avoided for all classes." The Farm Buildings Committee for England and Wales[5] quotes the National Veterinary Medical Association as recommending a temperature of 68° to 72° F. as the optimum for piggeries. While further research is obviously necessary in order to obtain data on which to base reliable recommendations with regard to optimum, minimum and maximum temperatures for piggeries, the above information must serve meantime as a guide.

The beneficial effects of supplying artificial heat to sows with litters during cold weather have been appreciated by a proportion of pig keepers in this country for many years. Price and Ling found during their survey that "several progressive farmers stressed the importance of providing artificial heat in the farrowing houses in the winter months; in some cases this was achieved by an elaborate system of hot water pipes, whereas in the smaller houses hurricane lamps were used for this purpose." Witz[26] claimed that pig producers raised one or more pigs per litter by supplying heat for the little pigs. In tests at the Indiana Experiment Station and the U.S. Bureau of Animal Industry[18] it was found that electric pig brooders saved an average of one to one and a half pigs per litter. Braude[3] points out an interesting aspect of the use of artificial heat for piglings. He provided heat by means of hot

water pipes underneath an asbestos floor in a small creep in order to attract the piglets away from the sow and thus protect them from crushing.

Humidity.—It is sometimes suggested that continued exposure to atmospheres with a high relative humidity has an adverse effect on the health of animals by "the prevention of free respiratory and cutaneous outlet of waste heat and products of metabolism."[12] While this may have an element of truth so far as the development of heat stroke in animals in the tropics is concerned, it obviously does not apply to the conditions normally prevailing in this country. Dampness will, however, tend to aggravate the adverse effect of cold conditions, while condensation on internal surfaces may be harmful to the fittings of the building. On the other hand, the humidity in a building is so dependent on external climatic conditions that, in the absence of air conditioning, there is little one can do about it save to see to temperature, especially by providing efficient insulation.

Space Allowance.—With regard to the size of piggeries, there is again a shortage of information on which to base precise guidance. It has already been indicated that Linton's recommendations of 200 to over 400 cubic feet per bacon pig are without sound foundation, and are disastrous from the point of view of temperature in cold weather, as well as being unnecessarily expensive. Shanks found bacon pigs did very well where they were given a floor space of 6½ sq. ft. per pig and a cubic space of 50 cu. ft. each in an inside pen to which was attached an outside run. Price and Ling found pigs healthy and thriving where the capacity of the house was small relative to the number of pigs; unfortunately, they do not give measurements. Davidson says a light bacon pig requires about 9 sq. ft. of floor apart from dunging space while Zorn[28] recommends 16 to 25 sq. ft. of floor space for fattening pigs housed individually, and 13 to 17 sq. ft. when housed in groups. As the German piggery is usually about 6½ ft. high, the cubic space in this latter case would be about 70 to 100 per cent. above Shanks' figures where the animals are housed in groups. It has already been pointed out that the floor space for a sow and litter must be relatively large and in this connection Zorn recommends that the floor space should be 43 to 54 sq. ft.; but this is only about half the amount recommended by Linton.

Ventilation.—As indicated above, we have no scientific evidence on which to base a reliable recommendation for the amount of air to supply to a pig. We know that there must be a flow of air to supply oxygen and remove carbon dioxide and moisture, to dilute suspended impurities, and to maintain a certain degree of air movement; and if other things were equal, it would appear to be a wise plan to supply large amounts of fresh air. But at times other things are not equal and as we have seen, the supplying of large amounts of fresh air is one of the factors leading to low temperatures with consequent detrimental effects. In the present state of knowledge or lack of it, we can only say that while plenty of fresh air may be admitted in warm weather to prevent the temperature rising too high, in cold weather the air flow should be cut down so that the temperature can be kept as near as possible to what has been suggested by most workers as the suitable range, *viz.*, 50° to 75° F., bearing in mind at the same time that the atmosphere should not be allowed to become foul or oppressive.

In order to maintain a steady flow of air through the piggery, suitably placed ventilators must be provided. Unfortunately, theoretical consideration of this aspect has in the past concerned itself largely with the perflation factor in ventilation and has ignored density and aspiration effects. As a result not only have some of the duct areas recommended been excessive, but often undue attention has been paid to inlets although even on theoretical grounds outlets can be shown to be more important in ensuring efficient ventilation. A series of experimental studies (J.S.S.I.—unpublished) have confirmed this fact and also that the outlet is most efficient from the point of view of avoiding a foul oppressive atmosphere and excessive humidity when placed at the highest point in the building. For an efficient system the inlets should be placed fairly low and must be baffled if dangerous draughts are to be avoided. Specially constructed inlets will not as a rule be necessary when there is a door leading from the pen to an outside run. It is obviously impossible to make precise recommendations for the area of inlets and outlets as we do not know how much air must be admitted per hour. Linton and the Farm Building Committee's Report give recommendations based on patently erroneous reasoning as indicated above. Linton recommends 9 sq. in. inlet and outlet for a large pig; the Farm Building Committee's Report states the irreducible minimum is 2·6 sq. in. per pig. of 150 lb. One could agree that inlets and outlets should be provided so that such areas could be attained or even surpassed in warm weather, but they must be adjustable so that in cold weather they can be closed so far as is necessary to attain a reasonable temperature. In warm weather the ventilators can be opened to their fullest extent and extra ventilation obtained by opening windows and doors.

Design

Runs.—There is some evidence that for at least parts of this country it is useful to provide piggeries with outside runs. Many practical pig keepers have noticed that when the pigs are continually indoors in a communal piggery they develop a cough. This condition was noted by Price and Ling during their survey in the South-West of England and also by Shanks in Northern Ireland, although the precise cause is not understood. Shanks also noted that when a Danish type house without yards was warmed up to 70° to 80° F. by closing all the ventilators, the atmosphere became foetid and he concluded that in order to get the necessary warmth without excessive contamination of the atmosphere, outside runs must be provided, so that faeces and urine can be passed outside the house. Whilst this conclusion may be justified, we must remember that to close all ventilators is obviously ridiculous and bad results are bound to follow such action. Also it has been noticed in Denmark[21] that provided a building is well insulated the temperature can be maintained and the air flow still kept at such a level that the atmosphere remains tolerable. Price and Ling found the atmosphere foul in a Danish type piggery where no dunging passage was provided and the pigs in this case looked thoroughly unthrifty. There is no doubt that, if provided with an outside run, the pig will normally use it for passing faeces and urine and this keeps the inner compartment clean and dry with its atmosphere relatively pure. Linton and Anthony are critical of the piggery with outside runs on the grounds that the pigs are exposed to extremes of temperature, although there are cases of such piggeries being used successfully for many years. Price and Ling found that pig farmers who used outside runs had very healthy pigs and Shanks found such a layout exceptionally satisfactory. Steinke holds that the type of house with an outside run comes near the ideal solution of the problem as it pays most attention to the natural characteristics of the wild pig which has a warm dry den and goes outside to micturate and defaecate. In an outside run, moreover, pigs get the benefit of the direct rays of the sun and they are able to remain outside should the temperature of the pen become too high in warm weather. There is general agreement that it is a good plan to erect a light roof over at least part of the run as a protection against rain and strong sunlight. The flooring of the run must be such that it can be cleaned to avoid a heavy concentration of parasitic worms and for this purpose some impermeable material such as cement concrete is essential.

Internal Layout.—The arrangement inside a communal house usually consists of a row of pens on each side of a central feeding passage. This helps to keep the cubic space of the house relatively small provided the passage is kept narrow. The 7 ft. passage recommended by Linton and the 6 ft. 10 in. recommended by the Farm Buildings Committee are much wider than necessary and undesirably wide from the point of view of temperature control. The 4½ ft. width shown in the Farm Buildings Report for Scotland[6] would obviously be more suitable. A single row of pens has an advantage where outside runs are provided, since if these are on both sides there is a tendency for draughts across the building. It has been suggested that it would be a good plan in a breeding house to have a single row of pens with runs on the south side.

In the Danish type of piggery there is a dunging passage behind the pens. While this helps to keep the pens clean and is a most useful labour-saving arrangement, it is open to several criticisms. There is always the danger, probably largely theoretical, of increased risk of carrying infection from pen to pen, even if the unsatisfactory arrangement of having an open drainage channel running along the passage is avoided. The provision of such a passage is obviously a drawback from the point of view of warmth as it increases the floor space and consequently the air space per pig. A dunging passage is unnecessary where there are outside runs which can be used by the pigs at will, but where this is not possible it is obviously of considerable value. One should, however, avoid making the cubic space per animal excessively large.

The piggery is usually divided into pens by partitions which are about 4 ft. high, these divisions being made generally of concrete or brick. Steinke points out that partitions should be made of material which is a poor heat conductor, and adds that boarded

partitions are often used and that strong wire netting in a wooden frame is also quite suitable. Wood of course, has the disadvantages that it is difficult to disinfect and is not very durable, but there are many examples of wooden buildings and wooden partitions which have worn reasonably well over a fair number of years. Wire netting does not protect the pigs from draughts and this may be an important practical point. Anthony points out that many pig attendants hold that most cases of pneumonia tend to occur in the pens situated at the extreme ends of buildings and he recommends that the solid partitions nearest the doors should be raised to 6 ft. or so. The Farm Buildings Committee for England reported that brick divisions on the whole have given satisfaction and also recommends precast cement concrete slabs for this purpose but holds that very massive divisions have a bad effect both on temperature and humidity. As a result of the work of Waldman on the control of pig influenza, Shanks and the National Veterinary Medical Association recommend carrying the pen divisions right to the roof with a view to preventing the spread of this disease. Shanks says the lower parts with which the pigs come in contact should be of concrete while the upper parts can be made of wood.

Flooring.—In considering the flooring of pig houses we must remember that wet foul conditions are dangerous as they lead to heavy worm infestation and encourage outbreaks of other parasitic and bacterial diseases. Such conditions also lead to a humid foul atmosphere. In order to avoid such conditions it is essential to have an impervious floor, for which cement concrete is usually used. This is by no means ideal owing to its high conductivity and specific heat which make it a cold flooring material. Unfortunately there is no alternative at present which is so easily kept clean, so durable, and which can be produced at an economic price. Further, it is held that if the concrete is insulated by laying it over hollow bricks or some other good insulating material and if the temperature of the house is maintained at a reasonable level, it can be quite satisfactory. Zorn maintains that hard burnt bricks placed on a firm layer of slag, 25 cm. thick, make a warm floor and Wagener [24] states that "Harrizit," which consists of small pieces of cork combined with asphalt, is an excellent though expensive flooring material, being rough, impermeable, warm and dry. Wooden floors are quite widely used in Germany according to Steinke. They have the disadvantage that they are difficult to disinfect and they absorb urine but where an outside run is provided they usually keep quite dry. Huts with wooden floors are quite satisfactory when used in outdoor systems. Wooden stages are widely used for extra warmth on cement concrete floors and Price and Ling came to the conclusion that they were obviously necessary where floors were bad, but it is a widely held opinion that if the floor is well insulated they can be dispensed with. The same workers concluded that wooden stages, which were a permanent fixture or too heavy to move to permit disinfection of the floor, were one of the predisposing causes of scour in young pigs.

Drainage.—The floors of piggeries must be adequately sloped so as to allow the urine to flow out of the building as soon as possible. The arrangement where the urine channel runs down the side of the central feeding passage as recommended by Linton is unsatisfactory as the decomposing urine leads to an impure atmosphere; the arrangement where the urine channel runs along the dunging passage may have the additional disadvantage of spreading infection more readily. Price and Ling noticed that the atmosphere in those houses with an internal urine channel was considerably fouler than in those equipped with the channel outside, and concluded that the latter arrangement was desirable.

Farrowing Rails.—Farrowing rails are sometimes recommended for breeding pens though some practical pig keepers have decided that the presence or absence of these fittings matters little. Fishwick [10] and Price and Ling state that with selected sows they appear to be unnecessary. Opetz [17] definitely disapproves of farrowing rails. He says that experience shows that most pigs are crushed in the centre of the pen; the farrowing rail makes this space smaller and consequently encourages what it is hoped to prevent. A brooder arrangement is obviously an adequate and possibly improved substitute for farrowing rails.

Lighting.—Light is essential if pigs are to thrive. Zell [27] suggested that as the pig was a nocturnal animal, the window space should be greatly reduced with a view to conserving warmth, for windows have a high conductivity rate. On the other hand, Ohl [16] emphasises that pig-keeping without windows is impossible and Steinke found that all German pig breeders agreed with this latter view. Price and Ling state that the value of light in piggeries was clearly demonstrated on a farm where one end of the house consisted entirely of panes of glass; the pigs in this adequately lighted pen invariably reached bacon weight many days before pigs in pens farther away from the light. With regard to the amount of window space required in piggeries—in Germany it is usual to allow 1/15 to 1/20 of the floor space as the window area; Meissner [13] recommended 1/10 of the area of the floor, but Steinke states that such a large space would have a bad effect on the temperature of the house. The Scottish Farm Buildings Committee recommends 1/15 of the floor space as the area of the windows. The English Committee on Farm Buildings recommends 1 sq. ft. per pig for wall windows, which is just about the same as the Scottish recommendation if we consider the floor space recommended. However, the latter Committee points out that in roof lighting the area need only be one-third of the amount. Light would appear to be beneficial to pig production both directly and indirectly, for in addition to the evidence quoted above there is no doubt that light in buildings promotes cleanliness—dirt unseen is usually dirt undisturbed. On the other hand, windows do have the disadvantage of allowing too rapid a transference of heat, an attribute which can be corrected to some extent by providing double windows as is often done in Scandinavian countries. Glass substitutes which admit ultra violet rays are sometimes stated to have obvious advantages for piggery windows, but they are not strong and in any case their value is usually rapidly reduced by dirt; adequate dosing with cod liver oil is obviously a more sure way of dealing with the rickets problem. The windows of the community house should be located so that direct sunlight reaches all the pens for some part of the day even in winter. With this end in view the long axis of double range houses may be set north and south and the windows made to face east and west. Similar effects can, however, be obtained by other arrangements.

Doorways.—The doors of a piggery are liable to cause both heat losses and draughts. To avoid excessive heat losses, insulated doors can be used, and to avoid draughts baffle walls can be erected inside the doorways. Shanks recommends such baffle walls inside the doors leading from the pens to the outside runs. It is also a great advantage to have a self-closing door, which the pigs can operate at will, between the outside run and the pen; for this purpose the horizontally hung door recommended by Shanks appears suitable.

Outdoor Systems.—So far we have discussed mainly the communal piggery and this type of house would seem to be the most suitable for fattening pigs so far as liveweight gains and carcase quality are concerned. For sows and litters, however, there is evidence that it has some real disadvantages. Price and Ling found that, when sows and litters were kept in an intensive farrowing house, such advantages as controlled temperature, reduced labour and lessened attention at farrowing were more than outweighed by disadvantages such as unthriftiness, disease and heavy mortality amongst the young pigs. Waldman found young pigs were liable to pig influenza when housed in communal houses, where infection spread rapidly by contact and droplet infection. He found this disease could be completely controlled when sows and their litters were isolated both in their houses and in their runs, *viz.*, when the sow was provided with an individual hut and there was 1 to 1½ metres between the runs.

There is general agreement that the movable hut comes nearest the ideal solution of the housing problem for sows with litters. The good results obtained under such conditions appear to be associated with the warm condition inside the hut, the complete isolation of the sow and her litter from other pigs and the nutritional benefits which the young pigs obtain out of doors. The huts are warm because they are built of good insulating materials such as wood, and they can be improved still further by making the walls of two layers of wood and packing the intervening space with some insulating material such as barley chaff; they can also be relatively small as they are required only to give protection from the weather. Various modifications of the outdoor system such as the tethering system, and the fold unit system, are very satisfactory for rearing pigs. Steinke says that the huts need not be more than 5 ft. high and should preferably have only one doorway which should face in a southerly direction and away from the prevailing wind. The doorway can be protected by sacking in cold weather, and it should have slides at each side into which boards can be dropped so that the sow and litter can be shut in when necessary. Although under some conditions when the land is dry and well drained these huts can be used without floors, the general experience is that a suitable wooden floor is advisable under most conditions. Price and Ling emphasised the importance of having the huts draught-proof. Some farmers like a door or at least a small trap door at the back of the hut so that assistance can easily be given at farrowing time, but this tends to make the hut colder and may lead to draughts. Steinke maintains there is no need for a window in the outdoor type of hut as the pigs can get all the light they require when outside the hut; and if there is no window it helps the tempera-

ture conditions inside. The greatest danger of the outdoor system is heavy parasitic infestation, but this can be avoided by frequently moving the pigs and their huts. Waldman suggests an interesting alternative to moving the huts, *viz.*, flooring the run with sand which can be renewed periodically.

Situation.—In addition to the structure, size, etc., of piggeries, the situation has also an important bearing on health, for there is evidence that if pigs are kept on damp, low-lying sites adverse effects may be encountered. Price and Ling found that when pigs were kept on wet, low-lying soil there was general unthriftiness. The same has been noticed in Denmark where it has been observed[21] that even with well insulated buildings the animals develop a cough and are unthrifty if the buildings are erected on wet, low-lying soil.

Conclusions

In spite of the voluminous nature of the literature on the subject and of a certain amount of data obtained in various countries, it is still true to say that far too little is known of fundamental requirements for optimum environmental conditions in pig houses. It is obvious that the hygienists of the past, obsessed with the dangers of infection and the benefits of fresh air, have often led us sadly astray, and it is no wonder that Davidson feels constrained to suggest that "many theories of ventilating pig houses should be carefully examined for satisfactory evidence before money is invested in buildings based on them."

There is now increasing agreement that requirements of paramount importance for health and productivity alike are warmth and clean, dry surroundings though the methods suggested for attaining such ends are many and varied. Cold or wet conditions have definitely adverse effects though information is lacking about the precise aetiology of the coughing often noticed in communal pig houses and about the immediate cause of unthriftiness of young pigs born there in the winter months. We can give, moreover, little or no definite guidance to the designers of pig houses as to optimum temperature conditions, essential air flow, desirable cubic space, etc., as present opinions frequently are conflicting and have often been based on observations either frankly empirical or invalidated by inadequate attention to other important factors such as nutrition or specific disease. It is our considered opinion, therefore, that if the community is to reap the maximum benefit from any future extension of the pig industry, detailed investigation into all aspects of the relationship of housing to health and productivity under controlled experimental conditions is urgently necessary.

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Phosphomonoesterases in Bull Semen*

By

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Introduction

Kutscher & Wolbergs (1935) first reported the presence of a phosphomonoesterase in human semen active at an acid *p*H. Gutman & Gutman (1941) published values for both acid and alkaline phosphatase and confirmed the findings of Kutscher & Wolbergs (1935). Berg *et al.* (1941) reported the presence of acid and alkaline phosphatase in canine semen, while Reid *et al.* (1947) recorded the activity of these enzymes in the semen of healthy bulls. As far as has been ascertained, there is no literature on the activity of acid or alkaline phosphatase in the semen of infertile bulls, nor is there sufficient information on the stability and other properties of these enzymes as found in bull semen under various conditions of infertility. Consequently, it was decided to estimate the activity of phosphomonoesterases in the semen of bulls with testicular degeneration as well as hypoplasia. The main objects of the investigation were: to determine the behaviour of the two enzymes in testicular diseases and to explore the possibilities of diagnosing such disorders by estimating the phosphatase content of semen. In order to obtain comparable data, estimations were also made simultaneously on semen from fertile bulls. Some of the properties of these enzymes, particularly those of interest under the conditions of the present investigation, were also studied.

Material and Methods

In all, 53 ejaculates from 15 fertile bulls, 37 ejaculates from 11 bulls with testicular degeneration and 13 ejaculates from three bulls with testicular hypoplasia were examined. Samples of semen from fertile bulls were collected from the Reading Cattle Breeding Centre, Shinfield, while those from infertile bulls were procured from various farms in southern England. Samples in the former case were examined within three hours of their collection but those in the latter were stored at a low temperature for one to four days before estimation. The tube containing semen was wrapped in cotton-wool (half an inch thick) and ordinary newspaper (four thicknesses), and transferred to a thermos-flask containing chipped ice within ten minutes of the collection. The temperature in the flask fell gradually and remained constant at 4° to 8° C. for over 24 hours. On reaching the laboratory within one to three hours, the tube was taken out of the flask, kept at room temperature for five to 30 minutes for semen tests and replaced in the flask for a little over 24 hours, when it was placed in ice without wrapping it in cotton-wool or paper and kept in that condition until the time of estimation. All samples were diluted to one in 50 with normal saline (0·85 per cent. w/v NaCl) before the estimations were made. The effects of storing semen at a low temperature on its phosphatase content are discussed in a later paragraph.

Acid phosphatase was determined by a modification of the Gutman & Gutman (1940) method, using the succinic acid-borax buffer of Kolthoff (1925) at *p*H 4·0 instead of using the citrate-HCl buffer. A photo-electric absorptiometer was used with a Dufay-Spectrum red filter having the maximum transmission above 680 $m\mu$, and the results were expressed in Gutman & Gutman units per 100 ml. of semen.

Alkaline phosphatase was determined by a modification of the method of King & Armstrong (1934), using a sodium veronal-Na_2CO_3-HCl buffer of King & Delory (1940) at *p*H 10·0, and the results were expressed in King & Armstrong units per 100 ml. of semen. The same spectrum filter as for acid phosphatase was used. In both cases, the colour was developed for 30 minutes at 37°C. (one King & Armstrong unit is equivalent to two Gutman & Gutman units).

* This paper was read at the First International Congress of Physiology and Pathology of Animal Reproduction and of Artificial Insemination held at Milan, June, 1948.

RESULTS AND DISCUSSION

pH Optima.—Acid phosphatase of bull semen gave an optimum *p*H between 3·8 and 4·2 and alkaline phosphatase between 9·8 and 10·2 (Fig. 1). Sodium phenylphosphate was used as the substrate in both cases.

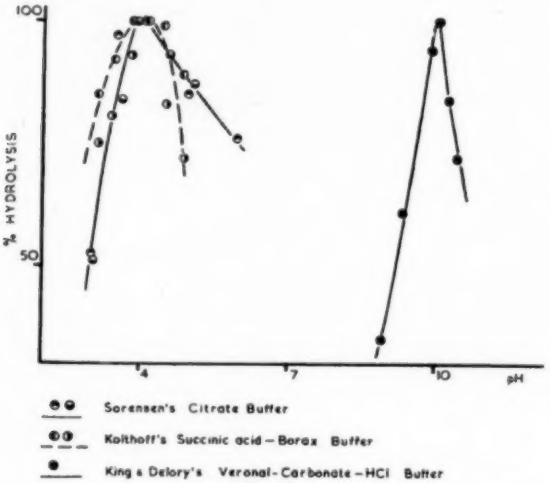

FIG. 1.

The relationship between the hydrolysis of phenylphosphate and the *p*H of hydrolysis.

Substrate Concentration and Enzyme Activity.—As shown below, the maximum activity was reached when the substrate concentration exceeded 0·01 M.

Substrate concentration	Phosphatase units per ml.	
	Acid	Alkaline
M/800	3·45	2·74
M/400	3·95	3·34
M/200	4·38	3·97
M/100	5·04	4·66
M/50	5·20	4·63
M/25	5·13	4·58

Dilution Effect.—As the enzyme determinations were preceded by a one in 50 dilution of semen with normal saline in all cases, it was thought that such a dilution might affect the activity of the enzyme. The determinations above and below a dilution of one in 50, therefore, were carried out, and it was found that the variation was not more than 2·5 per cent. for alkaline phosphatase and 4·0 per cent. for acid phosphatase between the dilutions of one in 40 and one in 80.

Stability.—Experiments were undertaken to determine the effects of storing semen at low temperatures as well as keeping it at room temperature. This information was important, as many of the samples from infertile bulls could not be examined within a short time of the collection. For this purpose, the samples were stored at 2° C. or kept at room temperature (15° to 17° C.) in a diluted as well as an undiluted state.

In the case of stored semen, a fairly consistent decrease in the activity of acid phosphatase was observed, while an increase observed in the activity of alkaline phosphatase was evident only up to the second day, after which this enhanced activity was maintained with a slight subsequent decrease. Storage at room temperature showed

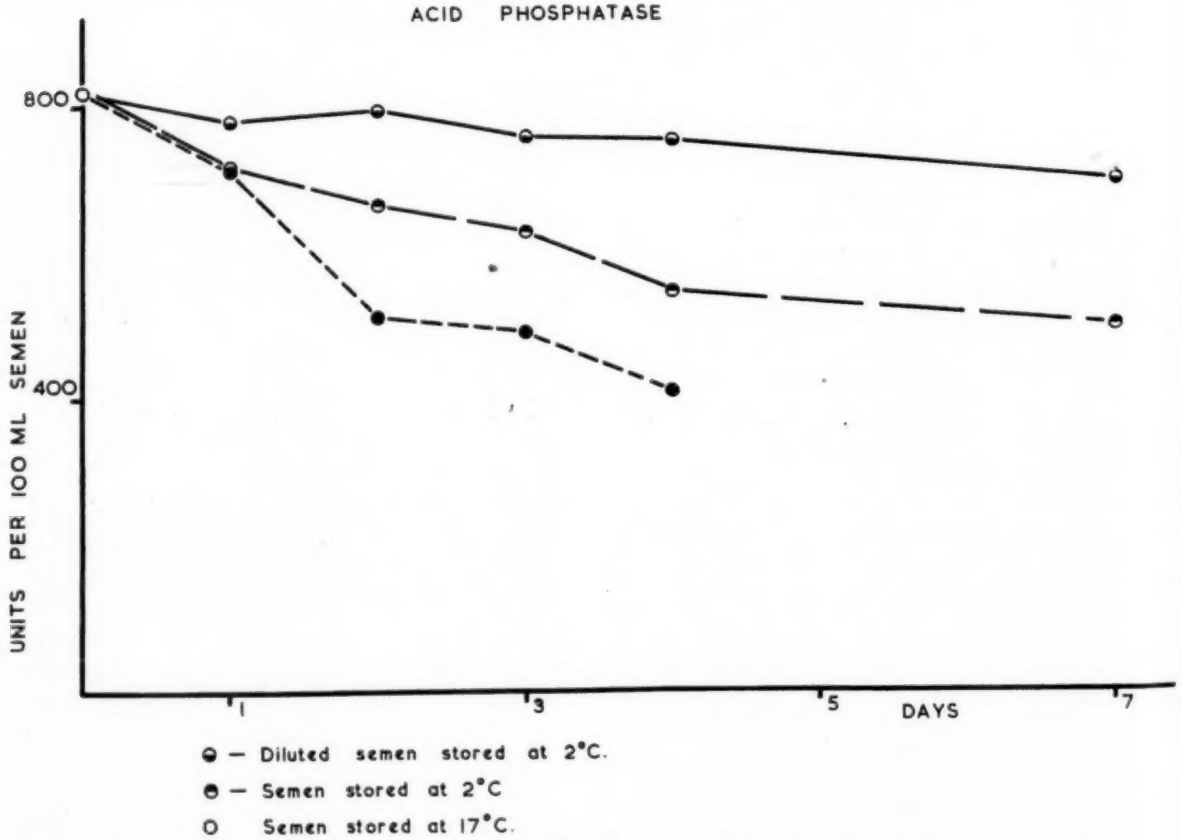

FIG. 2a.

The relationship between the activity of the acid phosphatase and the time of storage.

a considerable decrease in the activity of both acid and alkaline phosphatase. Alkaline phosphatase in stored diluted semen did not show an increase in its activity, as did the undiluted stored semen, but showed a gradual decrease. Acid phosphatase in diluted semen did not lose its activity as much as it did in the undiluted samples (Figs. 2a and 2b). The curious phenomenon of the increased activity of alkaline phosphatase on storing semen at 2° C. up to two days remains unexplained, but it may be due to (*a*) the production of an "activator" which does not form when semen is stored in a diluted state or (*b*) the production of the enzyme by the sperm.

Heating diluted semen to 62·8° C. for 30 minutes destroyed almost the entire amount of alkaline phosphatase, while acid phosphatase was destroyed to the extent of 70 per cent. only. Both were totally destroyed by heating semen to 100° C. for five minutes. The activity of alkaline phosphatase remained unaffected by a ten-minute exposure to the ultra-violet light* (directly or through a Wood's filter with maximum transmission at 365 $m\mu$), but the activity of acid phosphatase was reduced to the extent of about 10 per cent. by an eight-minute exposure to the direct ultra-violet light, although it remained unaffected when a Wood's filter was placed between the source of light and semen. This suggested that the destruction was due to the visible part of the spectrum.

Velocity of Reaction.—The scope of this work did not include an elaborate study of the kinetics of the enzyme, but it was felt that an investigation into the reaction velocity should be made. For acid phosphatase this velocity was constant up to 30 minutes and then decreased slowly. For alkaline phosphatase it gradually decreased from the start (Figs. 3a and 3b).

* The source of this light was an 800-watt (220 volts) quartz mercury lamp at a distance of 15 cm.

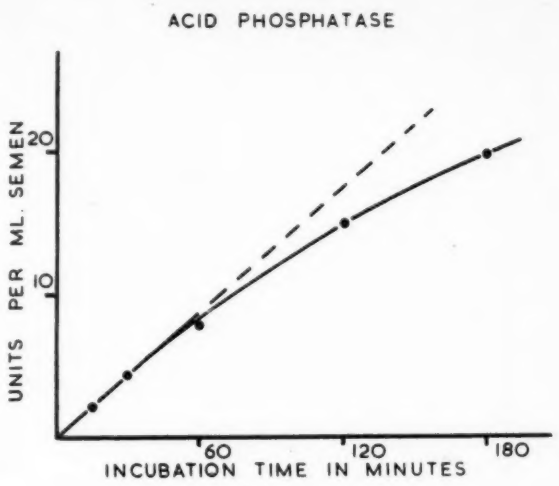

Fig. 3a.

The relationship between the hydrolysis of phenylphosphate and the time of hydrolysis.

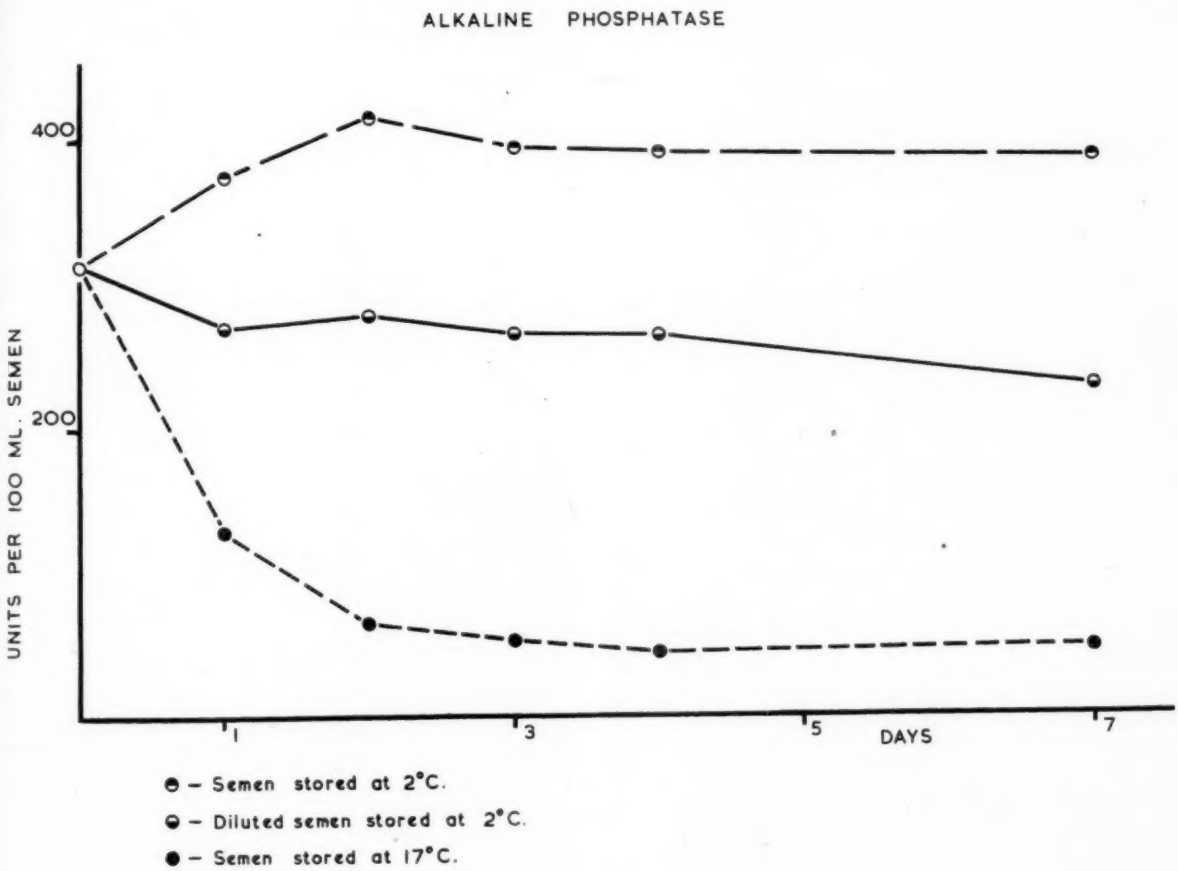

Fig. 2b.

The relationship between the activity of the alkaline phosphatase and the time of shortage

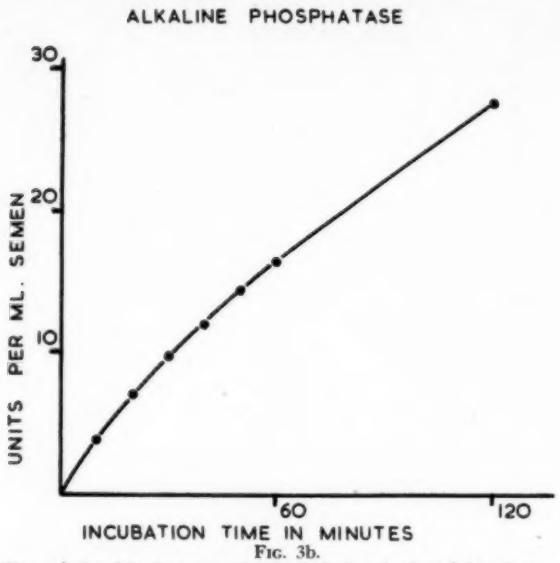

FIG. 3b.
The relationship between the hydrolysis of phenylphosphate and the time of hydrolysis.

Activity in Semen from Fertile Bulls.—As shown in Table I acid phosphatase averaged 789 units (min. 164, max. 1,650) per 100 ml. It was higher than 500 units in 87 per cent. and lower than that figure in 13 per cent. ejaculates. The figures showed a steady decline from the first to the third ejaculate, but definite conclusions could not be drawn owing to a dissimilar number of the first (32), second (16) and third (5) ejaculates. Alkaline phosphatase averaged 539 units (min. 115, max. 1,335) per 100 ml. It was higher than 300 units in 83 per cent. and lower than that figure in 17 per cent. ejaculates. The decline from the first to the third ejaculate was similar to that of acid phosphatase. The range of variation in different ejaculates collected from a bull on the same day was small, but a considerable variation occurred in ejaculates collected from a bull on different days.

Similar figures averaged from 53 ejaculates of ten normal bulls by Reid *et al.* (1947) were very much lower: acid phosphatase 170 units (min. 46, max. 338) and alkaline phosphatase 393 units (min. 97, max. 3,459) per 100 ml. As the definition of the units employed by these workers could not be ascertained, it is not possible to account for the difference between their figures and those reported above.

The source of acid phosphatase in the semen of bulls is obscure. Although the source of this enzyme in human semen has been traced to the prostate gland (Huggins, 1945), it is unlikely that the same is true of bull semen. As explained in the next section, acid phosphatase level not only goes down in testicular disease but also runs parallel with sperm density and percentage of abnormal sperm and, therefore, there is the strong likelihood of the production of this enzyme in the testicles. As regards the alkaline phosphatase, blood has been suggested as the immediate source of the enzyme in bull semen by Reid *et al.* (1947).

TABLE I
PHOSPHOMONOESTERASES IN THE SEMEN OF FERTILE BULLS

Serial number	Bull	Breed	Acid phosphatase. Gutman & Gutman units per cent.			Alkaline phosphatase. King & Armstrong units per cent.		
			I ejaculate	II ejaculate	III ejaculate	I ejaculate	II ejaculate	III ejaculate
1	BA	Friesian	850	—	—	724	—	—
			1,096	—	—	1,030	—	—
			737	938	—	665	687	—
			465	—	—	497	—	—
			612	712	—	293	372	—
2	RF	Shorthorn	—	518	528	—	423	388
			1,018	834	—	872	657	—
			1,020	—	—	900	—	—
			745	875	—	829	630	—
			740	755	—	667	531	—
			733	857	—	688	605	—
			467	753	655	434	685	562
			—	—	759	—	—	376
3	SRA	Guernsey	838	—	—	530	—	—
			1,140	—	—	964	—	—
			164	—	—	247	—	—
4	GP	Shorthorn	1,390	1,068	—	500	379	—
			1,074	1,360	—	286	414	—
			1,190	—	—	433	—	—
			—	—	952	—	—	192
5	KCR	Friesian	390	390	—	524	438	—
			420	—	—	589	—	—
6	GDGR	Guernsey	544	—	—	551	—	—
			906	—	—	553	—	—
7	WR	Shorthorn	—	603	—	—	443	—
			—	538	—	—	511	—
			—	589	—	—	558	—
8	MBB	Hereford	—	715	867	—	429	429
			943	—	—	490	—	—
			511	—	—	364	—	—
			750	—	—	246	—	—
9	TC	Hereford	615	—	—	524	—	—
10	MLD (20)	Shorthorn	1,070	—	—	861	—	—
			—	492	—	—	286	—
11	TRD	Friesian	1,022	—	—	681	—	—
			1,440	—	—	652	—	—
12	LMP	Guernsey	614	—	—	291	—	—
13	KMG	Guernsey	720	—	—	282	—	—
14	MLD (15)	Shorthorn	1,650	—	—	1,335	—	—
15	BLW	Shorthorn	534	—	—	115	—	—
		Average	821	739	748	581	500	389
	Average of all ejaculates			789			539	

Notes: (1) Blanks in the columns show that all the three ejaculates collected on one particular day could not be procured for processing.
(2) More than one set of ejaculates shown against a bull represents collections on more than one occasion.

Effect of Mg Ions and Sodium Fluoride.—The activity of acid phosphatase was unaffected by added Mg ions at a concentration between zero and qMg 1·801 (qMg being the negative exponential of the Mg ion concentration). Alkaline phosphatase, however, was considerably enhanced up to this concentration, reaching its maximum at qMg 1·501.

Sodium fluoride completely inhibited acid phosphatase at a concentration greater than 0·002268 M, while alkaline phosphatase was unaffected under similar conditions and even greater concentrations.

Activity in Semen from Infertile Bulls.—Table II shows the phosphatase content of semen from infertile bulls. In cases of testicular degeneration, acid phosphatase averaged 551 units (min. 124, max. 1,130) per 100 ml. Compared with the average for fertile bulls, 84 per cent. ejaculates showed a subnormal content. Even taking 500 units as the lower limit for fertile semen, as explained previously, 41 per cent. ejaculates were poor in acid phosphatase. Alkaline phosphatase averaged 508 units (min. 148, max. 1,510) per 100 ml. Compared with the average figure for fertile bulls, 65 per cent.

TABLE II

PHOSPHOMONOESTERASES IN THE SEMEN OF STERILE BULLS

Serial No.	Disorder	Bull No.	Acid phosphatase. Gutman & Gutman units per cent. I ejaculate	II ejaculate	III ejaculate	IV ejaculate	Alkaline phosphatase. King & Armstrong Units per cent. I ejaculate	II ejaculate	III ejaculate	IV ejaculate
1	Testicular degeneration	AB 8*	340	515	—	—	735	710	—	—
2	"	AB 20	870	674	—	—	715	635	—	—
3	"	AB 21	336	777	—	—	148	253	—	—
		" †	—	844	570	622	—	324	341	833
4	"	AB 23	—	700	646	—	—	213	227	—
5	"	AB 26	—	398	383	451	—	942	997	972
6	"	AB 27	641	529	606	—	520	348	479	—
7	"	AB 28	536	—	—	—	455	—	—	—
8	"	AB 31	291	478	—	—	199	232	—	—
		" ‡	183	438	505	124	218	219	266	175
9	"	AB 32	654	600	—	—	443	402	—	—
		" *	887	699	337	—	584	455	391	—
10	"	AB 33	928	1,130	—	—	835	1,510	—	—
		" §	899	563	—	—	1,010	1,015	—	—
11	"	AB 35	329	139	—	—	541	301	—	—
		" §	284	487	—	—	450	190	—	—
		Average	552	598	472		596	517	465	
		Average of all ejaculates			551				508	
1	Testicular hypoplasia	AB 18	57	90	48	—	42	102	57	—
		" §	383	—	181	—	199	—	149	—
2	"	AB 25	119	480	286	249	583	965	865	737
		" §	288	267	—	—	733	816	—	—
3	"	AB 36	150	286	—	—	109	124	—	—
		Average	199	281	191		333	502	452	
		Average of all ejaculates			222				422	

Notes: More than one set of ejaculates shown against a bull represent collections on more than one occasion.
* These ejaculates were collected after a course of P.M.S.
† " " " six months' rest.
‡ " " " a course of ascorbic acid.
§ " " " on a second visit after about two weeks.

ejaculates showed a subnormal content. If the lower limit were taken at 300 units, as explained above, semen was poor in this enzyme in 30 per cent. ejaculates. In most of the cases studied, acid as well as alkaline phosphatase increased in the second and decreased in the third ejaculate. The observations showed that in testicular degeneration the fall in acid phosphatase was more acute and obvious in a larger number of cases than the fall in alkaline phosphatase. They showed, further, that there was reason to suspect testicular dysfunction when the amount of acid phosphatase was below 500 units and that of alkaline phosphatase below 300 units.

In testicular hypoplasia, acid phosphatase was markedly low and averaged 222 units (min. 48, max. 480) per 100 ml. Alkaline phosphatase showed a similar decline and averaged 422 units (min. 42, max. 965) per 100 ml. Taking the three cases of hypoplasia individually, alkaline phosphatase was very low in two bulls (42 to 199 units) but normal in the third (583 to 965 units).

In order to find out a relationship between the phosphatase content and some of the characteristics of semen, four items, *viz.* density, abnormal sperm, motility and volume were selected. The average figures for acid and alkaline phosphatase, with the corresponding figures of density, abnormal sperm, motility and volume in the same ejaculates, are shown in TABLE III.

Table III shows that a rise or fall in acid phosphatase synchronised with a rise or fall in sperm density ($r = + 0{\cdot}753$: significant at 1 per cent. level) and the percentage of abnormal sperm ($r = + 0{\cdot}702$: significant at 5 per cent. level). Volume ($r = + 0{\cdot}0757$) and motility could not be correlated ($r = + 0{\cdot}437$). Alkaline phosphatase showed, in general, the same tendency as acid phosphatase. In bulls like AB 26, however, the content of alkaline phosphatase did not appear to have any relation with any of the semen characteristics studied. These observations are similar to those made by Reid *et al.* (1947).

A decline in acid phosphatase in testicular degeneration and particularly hypoplasia, coupled with its positive relationship to the density of sperm and the percentage of abnormal spermatozoa indicates that this enzyme most likely originates in the testicles. The lesser the intensity of spermatogenesis and the smaller the number of sperm, the lower the content of acid phosphatase and *vice versa*. The likelihood of the production of acid phosphatase in the testicles is also supported by the evidence of increased amounts, in the mitotically active spermatogenic cells in the testes, of desoxyribonucleic acid (Davidson & Waymouth, 1944; Hober, 1947) with which the acid phosphatase level has been found to run parallel (Moog, 1946). Very low values of acid phosphatase have also been recorded in cases of eunuchoidism (Watkinson, *et al.*, 1944).

TABLE III

RELATIONSHIP BETWEEN THE PHOSPHATASE CONTENT AND THE DENSITY, ABNORMAL SPERM, MOTILITY AND VOLUME OF SPERM

Serial No.	Bull No.	Phosphatase units per cent. Acid	Alkaline	Density per c.mm. (000)	Motility	Abnormal sperm (per cent.)	Volume (ml.)
				TESTICULAR DEGENERATION			
1	AB 8	428	723	709	26 (65·0 × 4·0)	20	5·1
2	" 20	772	675	1,512	5 (5·0 × 1·0)	53	6·2
3	" 21	557	201	886	156 (6·0 × 2·6)	31	5·4
4	" 23	673	220	632	180 (6·0 × 3·0)	18	2·0
5	" 26	411	970	680	180 (6·0 × 3·0)	28	2·2
6	" 27	592	449	846	104 (4·0·0 × 2·6)	35	2·3
7	" 28	536	455	562	40 (2·0·0 × 2·0)	25	6·6
8	" 31	337	218	461	55 (24·1 × 2·3)	30	4·5
9	" 32	635	455	904	96 (4·0·0 × 2·4)	32	6·6
10	" 33	880	1,093	1,044	55 (32·5 × 1·7)	100	3·3
11	" 35	310	373	506	150 (50·0 × 3·0)	27	3·5
				TESTICULAR HYPOPLASIA			
1	AB 18	152	110	—	0	—	5·5
2	" 25	282	783	94	7 (6·6 × 1·0)	33	3·7
3	" 36	218	117	24	23 (15·0 × 1·5)	47	5·1
				FERTILE BULLS			
Average figures		789	539	1,076	262 (70·8 × 3·7)	15	4·6

In the case of AB 32, there was evidence of an increased activity of acid as well as of alkaline phosphatase after a course of pregnant mare's serum. Acid phosphatase increased by 36 per cent. in the first and 17 per cent. in the second ejaculate. The corresponding figures for alkaline phosphatase in the two ejaculates were 32 per cent. and 13 per cent. respectively. His semen showed an all-round improvement and the fertility rate increased after the treatment. This observation points to a possible relationship of the phosphomonoesterases to the secretion of the male hormone, very probably through the mediation of the pituitary gland. A positive correlation between the androgen content of urine and the amount of acid phosphatase in semen has already been demonstrated in man (Enberg, *et al.*, 1947). The relationship between the activity of these enzymes as found in semen and the male hormone production in bulls requires further investigation. The results of such research might prove of value not only as regards the diagnosis of testicular disorders from an examination of semen, but also in treating more rationally some forms of infertility in animals and man.

In the case of AB 31, which did not respond to a course of ascorbic acid, the activity of acid and alkaline phosphatase was depressed to an extent of 6 to 37 per cent. This observation gives an indication of the inability of ascorbic acid to improve testicular function as assessed in terms of the seminal content of phosphomonoesterases.

1. The paper records the values of acid and alkaline phosphatase in 53 ejaculates from 15 fertile bulls, 37 ejaculates from 11 bulls with testicular degeneration and 13 ejaculates from three bulls with testicular hypoplasia.

2. Some properties of these enzymes, with particular reference to the conditions of the present investigation are described.

3. Approximate limits of the amounts of the enzymes in the semen of fertile and sterile bulls are fixed to establish a tentative basis for diagnosing testicular disorders.

4. The testicles are suggested as the source of acid phosphatase in the semen of bulls.

5. The determination of phosphomonoesterases in semen is put forth as a possibility of measuring the production of testicular hormone and observing the effects of therapeutic agents on the reproductive organs.

Acknowledgments.—The writers are indebted to Professors H. D. Kay and T. Dalling and Dr. N. S. Barron for their continued interest and guidance during the course of this work and to Mr. D. L. Stewart for providing semen from fertile bulls.

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Note.—Since this paper was read at Milan the authors have seen the more detailed publication of Reid, Ward & Salsbury (*Amer. J. Physiol.* **153.** 235 (1948)). From their paper, the reason for their low titres for the phosphatases in semen is most likely that enzyme determinations were not carried out under optimum conditions

REVIEW

[La Fecondazione Artificiale nel nord e nel Occidente europeo.]

This publication, issued by the Italian Artificial Insemination Institute of Milan, contains information gathered by the Director, Professor T. Bonadonna, during a tour of Denmark, France, England, Holland and Sweden, which he made in the summer of 1948. Facts and figures are given concerning the practice and control of A.I. in the various countries, and the text is supplemented by tables and photographs. It should prove of considerable interest to all those concerned with the development of A.I.

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Books also Received:

"Letters to Margaret" and "A Handbook of Self Analysis" (The Thesis Library). These are the work of Mr. Theodore Faithfull, M.R.C.V.S., who was formerly Principal of the Priory Gate School and is the author of two other popular books on psychology. The first book contains 23 letters written at intervals to a girl who was twelve at the time of the first letter, and dealing with the problems of youth and the development of mind and body.

"The Writer"—the Hutchinson monthly for the Journalist and Author.

An Ectopic (Intrapericardial) Lobe of the Liver in a Cat

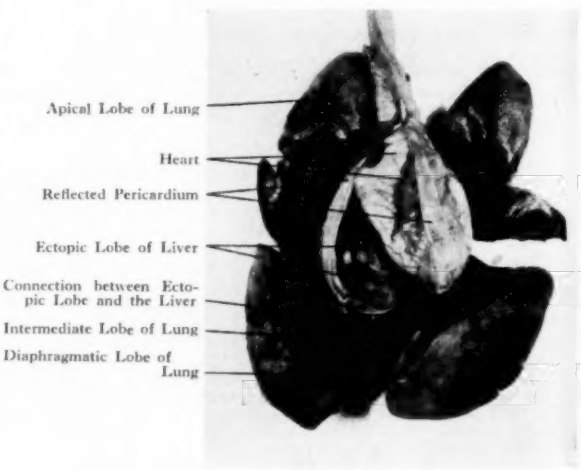
J. G. SPEED, M.R.C.V.S.,

Anatomy Department, Royal (Dick) Veterinary College, Edinburgh

A large adult male ginger-coloured cat with no history of illness was obtained for the purpose of providing some class specimens of thoracic viscera. The intestine and liver were removed so that the lungs and heart might be reached through the diaphragm, and unfortunately the liver was discarded. When the diaphragm was opened, what seemed to be a peduncle of liver tissue which had been cut was seen to pass through the tendinous centre of the diaphragm towards the thorax. The sternum was removed, and the heart and lungs were placed in formalin so that they might be preserved.

At this stage the specimen was brought to my notice by Mr. E. Roberts, Department Technician, who pointed out that the peduncle of liver tissue entered the pericardium.

On opening up the pericardium the appearance was remarkable: a large and completely formed lobe of the liver extended throughout the right and dorsal parts of the pericardial cavity, occupying quite half of the total capacity of the cavity. This lobe had the appearance of normal liver tissue, its lower and posterior borders being marked with fissures resembling those of the central lobe of a cat's liver, and it was enclosed in a serous membrane resembling peritoneum. The point of entry of the peduncle was below the caval hiatus of the diaphragm, and the pericardium had a thickened margin round the foramen by which the peduncle gained entry.



Discussion

The position of this ectopic lobe is on the right side of the heart in the pericardium, but it would seem that the occurrence could be related to the forward development of the liver rudiment while the duodenal loop was still on the left side: in that case it would have been interesting to have noted any displacement of the duodenum and pancreas, which might have been present in the animal.

Since the primitive lobes of the liver develop along the omphalomesenteric and allantoic vessels in the septum transversum, and since these vessels join the ductus venosus, it is possible to visualise a means of access to the pericardium for this ectopic lobe of the liver. Again, it could be remarked that the septum transversum forms the dorsal and posterior walls of the pericardium, while the entrance of the ectopic lobe's peduncle appears in the ventrolateral part as if from that portion of the septum which is lateral to the pleuro-peritoneal fold and separates the peritoneal recess from the pericardium.

The possibility of the condition having been the result of an accident was examined, but although it was possible to imagine a rupture of the diaphragm at this point, it was difficult to see how a neat round hole could have been punctured in the pericardium to allow the lobe's ingress without some sign of adhesion or scar.

The stalk which connected the ectopic lobe with the liver proper was examined histologically and proved to be of liver tissue, as also was the lobe itself.

Taking into account the relative sizes of the heart and the liver lobe within the pericardial sac, the heart could scarcely be expected to have functioned normally, since it occupied only about half of the pericardial cavity. The dilatations of the heart must have been greatly interfered with, and yet the development and apparent health of the animal were normal.

I would be greatly interested to hear of any similar occurrence in any animal, because in the dissections of thousands of dogs, and of numerous cats and horses done in this department I have never seen another case, and in the Clinical and Pathology departments there was no record of such a case.

ABSTRACTS

[**Further Observations on Experimental Treatment of Tr. foetus Infection in Bulls.** Bartlett, D. E. (1948.) *Amer. J. vet. Res.* **9.** 351.]

Further observations are given of experimental treatment of trichomonad-infected bulls. In the first section accounts are given of eight bulls treated with intravenous sodium iodide, the group comprising seven fresh cases and one previously treated. Dosage consisted of five injections at the rate of 5 grammes of sodium iodide per 100 lb. b.w. in 500 c.c sterile distilled water, at 48-hour intervals. Two of eight animals were cured and subsequently served virgin heifers with no ill effects. Trichomonads could not be demonstrated subsequent to the first dose of the treatment.

Previously reported cures with sodium iodide are reviewed, and show that ten of 19 infections in 17 bulls have been cured by iodides; two by potassium iodide *per os* and eight by intravenous sodium iodide.

The second section deals with treatment of eight bulls injected with *T. foetus*, with (1) silver protein powder (30 per cent. kaolin, 30 per cent. beta lactose, s.p.p. 40 per cent., dose 1½ oz. by insufflation repeated thrice weekly); (2) trypaflavine (0·5 per cent. in water-soluble gelatine base), and (3) G.P.C. (0·5 per cent. neutral trypaflavine and 0·05 per cent. surfen A in fat-free washable ointment base). Treatments with silver protein and trypaflavine (one bull each) were unsuccessful, trichomonads being demonstrated during treatment.

G.P.C. cured seven of eight bulls by a single treatment (two applications); the remaining infection was resistant to two treatments. G.P.C. was administered to the genital membranes after epidural anaesthesia of the bull in the standing position in specially constructed stocks. The membranes were washed with soapy water and dried, and the ointment (120 c.c.) was rubbed into the membranes for 15 minutes. The urethra was treated with solution (0·1 per cent). Each treatment consisted of two applications with an interval of ten to 14 days.

The principles of treatment are discussed and the author concludes that G.P.C. is unique in being the only topically applied agent which has so far proved effective in his hands.

D. H. L. R.

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[**Methadon, a New Analgesic.** Reutner, T. F., & Gruhzit, O. M. (1948.) *J. Amer. vet. med. Ass.* **113.** 448-451.]

Methadon is a new synthetic analgesic unrelated to morphine; the name has been approved by the American Council on Pharmacy and Chemistry; chemically the substance is designated 6-dimethylamino-4, 4-diphenyl-heptanone-3 hydrochloride. The writers state that the surgical anaesthetic dose for dogs by the oral, subcutaneous and intravenous routes was 35, 15, and 10 mg. per kg. respectively and the lethal dose (50 per cent. death of animals) was found to be 75, 50, and 27 mg. per kg.

The combination of this substance with a barbiturate for the production of surgical anaesthesia was investigated; unfortunately these investigations were restricted to the use of methadon with a thiobarbiturate that is not available commercially. It is claimed that the simultaneous intravenous injection of methadon and this thiobarbiturate reduced the dose of the latter by half and prolonged the duration of its action. Methadon given subcutaneously half an hour before the intravenous injection of the thiobarbiturate also reduced the dose of thiobarbiturate by one half.

Prolonged administration of methadon orally or subcutaneously to dogs in the dosage given produced neither cumulative toxic effects nor tolerance.

[*Abstractor's note.*—The authors' conception of surgical anaesthesia is not too clear. They say "Dogs receiving a surgical anaesthetic dose were prostrate but not completely relaxed."]

G. F. B.

REPORT

[**Industrial Fluorosis. A Study of the Hazard to Man and Animals near Fort William, Scotland.** Medical Research Council Memorandum No. 22, 1949. Price 4s.]

This is a valuable contribution to the literature dealing with fluorine intoxication, but it is to be regretted that such a comprehensive investigation into the consequences of the fluorine hazard should have been made on a local basis. The work would have been of much greater value and have been of more general significance if consideration had also been given to the other industries which emit fluorine into the atmosphere, and particularly those which cause more contamination than the factories manufacturing aluminium in Inverness-shire.

The main object of the enquiry was to determine any effects of exposure to fluorine compounds on workers employed in the factories manufacturing aluminium, and also to determine any similar effects upon people living in the neighbourhood. It was undertaken following the discovery that animals in the area were suffering from fluorosis due to the contamination of the atmosphere by a nearby factory.

Consideration was given to various aspects of the problem, such as the source of the fluorine and the chemical processes involved, its distriution within the area and the effect produced on human beings. It was found that some of the older work-people who had been engaged for a considerable number of years in the old furnace rooms showed bone changes indicative of fluorosis, but they were apparent only on X-ray examination and the subjects suffered no clinical disability. The Committee was unable to find any real evidence of intoxication amongst people living outside the factory, but considered that the possible risk to human health was such as to warrant the development of new building sites in zones least liable to contamination.

The effects of the fluorine contamination of the herbage on animals are described, and they obviously constitute a serious menace to the local farmers. In sheep clinical examination revealed the characteristic mottling of the incisor teeth with uneven wear and deformity particularly of the molars. It was considered that much, if not all, of the debility and emaciation observed in cattle and sheep could be attributed to imperfect mastication arising from the dental abnormalities. *Post-mortem* examinations were made on two cows and four sheep, but no detailed pathological data is given.

The report contains an appendix based on a review of the literature on work carried out by the staff of the Imperial Chemical Industries.

F. B.

STREPTOMYCIN IN THE TREATMENT OF THE HUMAN TUBERCULOUS SUBJECT

The Council of the British Tuberculosis Association desire to place the following information before all those specially interested in the prevention and treatment of tuberculosis. Streptomycin is now being manufactured in this country, and before long is likely to be available in amounts adequate to treat all those patients likely to benefit.

1. Streptomycin has been shown to have a favourable effect in the treatment of some forms of tuberculosis. In the treatment of pulmonary tuberculosis, it is rarely adequate alone to bring about a successful result; in many patients it has no beneficial effect.

2. Streptomycin may cause toxic reactions, and therefore needs to be used with caution.

3. The tubercle bacillus which causes the disease may rapidly become accustomed to the drug, and may develop high resistance to its action. This may prevent proper treatment of the patient if the drug is given at the wrong time, and may also result in other persons becoming infected by a bacillus which is resistant to streptomycin.

4. For these reasons it is the opinion of the Council of the British Tuberculosis Association that this remedy should be given only by those experienced or trained in its use, and in the treatment of the various forms of tuberculosis. Resources for the application of the established methods of treatment should be available, so that the course of streptomycin treatment may be timed in appropriate relation to these other forms of treatment. Owing to the above-mentioned risk of drug resistance, it may be possible to give only one effective course of streptomycin. The public should be instructed that only a proportion of patients may benefit, and that great harm may be done to individual patients and to the community by the indiscriminate and ill-timed use of this remedy. On the other hand, given in suitably controlled conditions, streptomycin can be of the greatest assistance to patients suffering from tuberculosis.

IN PARLIAMENT

The Laws Affecting Cruelty to Animals

Committee of Enquiry to be Appointed

WITHDRAWAL OF BILL TO PROHIBIT FOX HUNTING

A widespread welcome has been accorded the Government decision to set up a committee—which probably will be an independent body with wide terms of reference—to examine the law relating to cruelty to animals.

In the House of Commons on Thursday of last week the Lord President, Mr. Herbert Morrison, was asked by Mr. F. Fairhurst whether his attention had been called to a motion tabled in the House and signed by about 230 members which called upon the Government to set up an appropriate body to examine "the law relating to cruelty to wild animals" and to make recommendations.

Mr. Morrison replied that the Government thought that there was a case for investigation by a suitable committee and that they accepted the principle of a committee of enquiry. This course, he thought, might be desired not only by those who had supported the Bills to prohibit hunting and coursing but by others who took a different view. Steps would be taken accordingly in due course. He explained that at this stage the Government are not committed to the exact terms of reference for the committee.

As soon as this announcement had been made Mr. Fairhurst, who was to have moved in the House, on the following day, the second reading of his private member's Bill to prohibit fox hunting, said that in view of the Government's decision he would withdraw this Bill.

Private members are discussing the possibility of having this enquiry extended to cover the question of the export trade in horses and the unregulated slaughter of horses for human consumption about which much feeling was shown in the House earlier in the week. On that occasion the Minister of Agriculture at first said that he saw no useful purpose in arranging for a public enquiry into these matters, but under pressure from both sides of the House he finally agreed to reconsider this attitude. Since the Government are not committed to the terms of reference for the committee of enquiry this subject might be included.

The British Field Sports Society has stated that it welcomes the setting up of this committee and hopes that its terms of reference will cover the laws affecting cruelty to all kinds of animals.

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Exportation of Horses (Amendment) Bill

The text of the Exportation of Horses (Amendment) Bill which was formally introduced in the House of Commons on January 28th by Mr. A. D. Dodds-Parker, was issued last week.

This private member's Bill proposes that there should be established an Exportation of Horses Council to advise the Minister of Agriculture in the exercise of his power to make orders relating to the exportation and transport of horses. It would amend the Exportation of Horses Act, 1937. The Council, it is proposed, should consist of seven persons all to be appointed by the Minister. Two would represent societies for the encouragement of horse breeding, two would represent users of horses, and three would represent the Royal Society for the Prevention of Cruelty to Animals and other organisations concerned with the prevention of cruelty to animals. The council would make recommendations to the Minister about the making of Orders under the Exportation of Horses Act and the Diseases of Animals Acts relating to the exportation or transport of horses, asses, or mules. The Minister would be required to consider every such recommendation. The Bill would also require the Minister to consult the council before making any Order of this kind, other than one giving effect to a recommendation of the council, and to take into consideration any representation made to him in the matter.

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Coal Mines (Protection of Animals) Bill

Under another private member's Bill, the text of which was issued on Monday last, it is proposed to amend the provisions in the Coal Mines Act, 1911, dealing with the care and protection of horses and other animals employed in the mines. The Bill is entitled the Coal Mines (Protection of Animals) Bill, and it was presented by Mr. Osborne. The purpose of the amendment is to ensure that no horse will be worked more than 48 hours or seven shifts in a week.

Questions

HORSEMEAT SALES

Mr. NALLY asked the Minister of Food what action he proposes to take to prevent former butchers whose licences to trade have been withdrawn following conviction for black-marketing offences from entering into business associated with the slaughter of horses and the wholesale and retail sale of horsemeat.

Mr. STRACHEY: I am advised that my present powers may not be fully effective for such purposes. I am considering, however, the licensing of slaughterhouses where horseflesh is produced for human consumption on the same lines as knackers' yards are already licensed.

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MEAT (INSPECTION)

Mr. PETER FREEMAN (March 7th) asked the Minister of Food how many animals of each variety were condemned by his inspectors as unfit for human consumption in 1948; for what reasons; and what percentage these figures represent of the total number of animals inspected in each case.

Mr. STRACHEY: The responsibility for the inspection of meat for human consumption rests with the local health authorities. Records are not yet available for the complete year 1948 of the number of animals condemned, but the figures for the nine months January 1st, 1948, to September 30th, 1948, are as follow:

	Number of animals condemned	Percentage of number slaughtered
Cattle	22,134	2·20
Calves	10,341	1·25
Sheep and Lambs	10,550	0·35
Pigs	3,944	0·58

A summary of the reasons for condemnation of animals at each of the Ministry's 600 slaughterhouses is not available and could not be prepared without a considerable amount of work

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MEAT (ILLEGAL SALES)

Mr. HARRISON (March 7th) asked the Minister of Food to what extent his officers check farmer-dealers' stock sheets; whether they try to trace beasts taken to the grading centre and brought away again; what checks are made on pig clubs, when excessive numbers of pigs are killed, to ascertain if they actually feed all their stock, and on butchers' buying permits, when such permits have increased to a considerable extent over short periods; and how far these efforts have been successful in stopping illegal sales of meat.

Dr. SUMMERSKILL: As this Question calls for a very long answer, I will, with permission, circulate it in the OFFICIAL REPORT.

Following is the statement:

I will answer this Question point by point. First, local authorities are responsible for enforcing and checking the registers which farmers are required to keep under the Ministry of Agriculture's Movement of Animals (Records) Order, 1925, but our officers consult them where necessary. Secondly, enquiries are made about the disposal of animals withdrawn from grading if it is suspected that they are to be sold for slaughter illegally for human consumption. Thirdly, pig clubs are subject to the same regulations about registration and slaughter as other self-suppliers, and the same procedure is followed in both cases to see that the conditions of the scheme are observed. Fourthly, meat authorisations to butchers are completed weekly or on the basis of registrations and other requirements, and are drawn up by our local officers who, with their local knowledge, report any irregularities. Fifthly, I am satisfied that these and the other measures which we take help to curb illegal sales of meat.

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HORSE POPULATION

Mr. PETER FREEMAN (March 7th) asked the Minister of Agriculture what is the present population of horses and what was it in 1938; and at the same rate of decrease when will horses be extinct in this country.

THE MINISTER OF AGRICULTURE (Mr. THOMAS WILLIAMS): The total number of horses on agricultural holdings in the United Kingdom in 1948 was 703,000, that in 1938 was 1,101,000. I see little risk of the horse becoming extinct in this country in the forseeable future. For certain purposes horses have an advantage over mechanical power.

Lt.-Col. Sir THOMAS MOORE: Would not the right hon. Gentleman consult with his right hon. Friend the Parliamentary Secretary to the Ministry of Food, before she leaves the Chamber, with a view to her Department supplying us with some more stringy Argentine beef, rather than that we should see the horse population continue to be lessened in this way?

Mr. WILLIAMS: I should not have thought that the hon. and gallant Gentleman was worried by a lot of horse meat.

Sir T. MOORE: Oh, yes; I queue up for it.

Horses and Ponies in Mines

Mr. Peter Freeman (March 3rd) asked the Minister of Fuel and Power what is the average number of working years of the horses used below ground in the mines of South Wales; and the average working life of the ponies employed in Durham, Northumberland and Yorkshire, for the past ten years.

Mr. Robens: I regret that the information available is insufficient to enable a reliable estimate to be made.

Mr. Peter Freeman asked the Minister of Fuel and Power whether he will make a regulation pursuant to the Coal Mines Act, 1911, in order to provide horses and ponies employed continuously below ground in mines with a month's rest on the surface every year or in every alternate year.

Mr. Robens: Great care is taken under the strictest supervision to ensure that horses employed in coal mines are not overworked and I do not think that the proposed regulation is either necessary or desirable.

Mr. Peter Freeman asked the Minister of Fuel and Power whether he is aware that four old pit ponies which were destroyed at Lambley, Northumberland, were all over 20 years of age; how many years over 20, respectively, these four ponies were when taken up; and whether he is satisfied that ponies over the age of 15 years should be employed below ground in mines.

Mr. Robens: I am informed by the National Coal Board that the four ponies recently withdrawn from underground work at Lambley Colliery and destroyed were aged 21, 22, 25 and 29 years, respectively. I do not consider it desirable to impose a rigid age limit for horses and ponies employed in mines. The physical condition of each animal should be the deciding factor. Although no exact figures are available, the normal age at which ponies are withdrawn from underground work is estimated by the National Coal Board to be about 15 years but in the experience of His Majesty's Inspectors of Mines many ponies over the age of 15 years are well up to the work and may be safer than younger animals.

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Motor Cars (Home Market)

Mr. Edelman (March 7th) asked the Minister of Supply whether, in view of difficulties now being experienced by the motor industry as a result of certain foreign countries restricting, for currency reasons, the import of motor cars, he will temporarily reduce the export quota and allow orders for the home market to be fulfilled, thus enabling full employment to be maintained in the industry.

Mr. G. R. Strauss: This matter is being considered in the light of representations made to me by the National Advisory Council for the motor manufacturing industry.

Mr. Edelman: In the course of the discussions, will my right hon. Friend bear in mind that unless the flow of production is maintained the cost of cars will rise, and damage will be done to the industry both in the home and export markets?

Sir Patrick Hannon: Surely in view of the circumstances of the motor car industry at the moment, and the restrictions imposed upon it in foreign markets, the Minister will give a slightly greater release of cars to the home market at the present time?

Mr. Strauss: I appreciate the points which have been put to me, but we have to be careful how much of our export production is devoted to home purposes instead of being sent abroad.

PROFESSIONAL MEN'S ART EXHIBITION IN PARIS

There has been held, from February 27th to March 13th, at the Galerie des Beaux Arts in Paris, the 21st exhibition of artistic work by doctors, dentists, pharmacists and veterinarians. This exhibition was first started in 1909 and has been held regularly each year except during the war. There are sections devoted to painting, sculpture, decorative art, photography, etc., and there is now a literary section.

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A committee of the Animal Health Trust is to be formed in Surrey under the presidency of Viscount Chelmsford and chairmanship of Mr. G. R. H. Nugent.

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Professor James Gray, F.R.S., has been appointed by the committee of Privy Council for agricultural research to be a member of the Agricultural Research Council. For Professor Gray, who holds the Chair of Zoology at the University of Cambridge, this will be his second term of office as member, his first being from 1942 to 1947.

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Weekly Wisdom

History never "happens"—it is brought about by the free decisions of men as they decide whether to be courageous or cowardly in the face of to-morrow.—Professor Arnold Toynbee, the historian—in *World Review* (January, 1949).

NOTES AND NEWS

Diary of Events

Mar. 23rd.—Special Meeting of the Scottish Branch, N.V.M.A., at Glasgow (Ca'Doro Restaurant, Union Street), 2.30 p.m.

Mar. 24th.—Annual Meeting and Luncheon of the Western Counties Division, N.V.M.A., at Exeter (Rougemont Hotel), 2.15 p.m.

Mar. 25th.—Meeting of the Midland Counties Division, N.V.M.A., at Birmingham (Grand Hotel), 2.30 p.m.

Mar. 25th.—Annual Meeting of the Biochemical Society, in the Department of Biochemistry University College, Gower Street, W.C.1, 11 a.m.

Mar. 30th.—Meeting of the West of Scotland Division, N.V.M.A., at the Glasgow Veterinary College, 6.30 p.m.

Mar. 31st.—Special General Meeting of the South-Eastern Division, N.V.M.A., at Maidstone (Royal Star Hotel), 6 p.m.

Mar. 31st.—Meeting of the North Wales Division, N.V.M.A., at Bangor (School of Agriculture, Memorial Building), 2.30 p.m.

Apr. 5th, 6th and 7th.—Quarterly Meetings of Council, R.C.V.S.

Apr. 7th.—Meeting of the Central Veterinary Society at the Royal Veterinary College, Camden Town, 6 p.m.

Apr. 12th.—Central Veterinary Society: One-day Poultry Course at the Royal Veterinary College, commencing at 10.30 a.m.

Apr. 20th, 21st and 22nd.—Quarterly Meetings of Committees and Council, N.V.M.A., in London (Meeting of Council, April 22nd).

Apr. 21st.—Annual Race for the R.A.V.C. Point-to-Point Challenge Cup, at Melton Mowbray (Quorn Hunt Meeting).

Apr. 23rd.—Association of State Veterinary Officers: Annual Meeting at the Royal Veterinary College, Camden Town, 2 p.m.; Annual Dinner at the Criterion Restaurant, Piccadilly, 6.30 p.m.

Apr. 28th.—Special Meeting of the Central Veterinary Society at the Royal Veterinary College, Camden Town, 2 p.m.

May 16th.—Annual Meeting of the R.A.V.C. Golfing Society, at North Hants Golf Club, Fleet, 10 a.m.

June 1st (Wednesday).—Annual General Meeting of the Royal College of Veterinary Surgeons.

June 1st, 2nd and 3rd.—Quarterly Meetings of Council, R.C.V.S.

Aug. 8th to 13th.—Fourteenth International Veterinary Congress, Central Hall, Westminster, and Church House, Westminster, London, S.W.1.

Aug. 12th to 15th.—Sixty-seventh Annual General Meeting and Congress, N.V.M.A., in London.

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PERSONAL

Appointment of Mr. J. L. O'Connell as Chief Horse Superintendent, Railway Executive

The appointment recently has been announced of Mr. John L. O'Connell, M.R.C.V.S., to the important post of Chief Horse Superintendent, Railway Executive.

Mr. O'Connell was born in County Cork of a well-known sporting family, his father being a prominent farmer and business man. Most of his early days were spent at Ennis Keane, Co. Cork, where he has the happiest recollections of hunting his uncle's harriers over this beautiful but hazardous country, often mounted on young and unmade four-year-old hunters, and he still bears scars of his many tumbles. He was also a keen coursing enthusiast, and was a prominent member of one of the local clubs with which his family had been associated for many years.

He was educated at Presentation College, Cork, where he excelled at sports, especially rugby. After matriculating he went on to Trinity College, Dublin, and the Veterinary College, where he had a distinguished career, obtaining honours in many subjects, and was awarded the Silver Medal for Animal Husbandry.

During vacation as a student Mr. O'Connell saw practice with the late and well-known John F. Healy, who had a very extensive hunting and agricultural practice in that fine sporting country, Middleton, Co. Cork, and Mr. O'Connell recalls many amusing incidents during his time spent with this great and well-loved character.

After qualifying, Mr. O'Connell was selected by Paddy Howard to be assistant to his great friend Trevor F. Spencer, of Kettering. He had the greatest affection and admiration for Trevor, and no task was too difficult for him in his endeavour to help his Chief. During his years at Kettering he was a well-known follower of the Pytchley and Woodland Pytchley and was recognised as a brilliant horseman and a fearless rider to hounds.

He joined the L.M.S. in 1936, and was soon—and at the early age of 30—appointed Horse Superintendent and Veterinary Surgeon, London and District. He was in charge of the largest stud of horses during the bombing of London, and had the highest regard for the L.M.S. stablemen and carters.

Mr. O'Connell was appointed Chief Veterinary Surgeon and Horse Superintendent, L.M.S., in 1945, and here again his knowledge of agriculture and horsemanship fitted him well for this position.

He has broadcast on numerous occasions, and had the interesting experience of televising in connection with his position.

Soon after nationalisation of the railways, Mr. O'Connell was selected by the Railway Executive to conduct an enquiry and report on the horse organisations of the four large companies. His report was favourably received by the Executive, and his re-organisation scheme adopted.

The good wishes of Mr. O'Connell's many friends in the profession and horse world will be with him in his task of controlling the railway stud of 7,500 horses.

. . . . . .

Other Appointments.—The appointments in the Colonial Veterinary Service are announced of Mr. G. F. P. Doran, M.R.C.V.S., Capt. late R.A.V.C., as Veterinary Officer, Tanganyika, and of Mr. C. Douglas as Veterinary Officer, Gambia.

. . . . . .

Sir Thomas Baxter's Retirement.—It is announced that Sir Thomas Baxter, now 71, who has been at the helm of the Milk Marketing Board as its chairman since its inception in 1933, is to retire in June. Not only the 160,000 dairy farmers in England and Wales, but members of our profession admire the drive and enthusiasm with which Sir Thomas, during these 16 years, has enabled the Board to develop very extensive services to milk producers and the nation.

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R.C.V.S. OBITUARY

Bate, Alfred, formerly of Ellesmere, Shropshire. Graduated N. Edinburgh, May 23rd, 1888. Died March 7th, 1949, at Penstone, Gobowen, Shropshire; aged 81 years.

Gilmore, Hugh David, J.P., M.R.C.V.S., Kircubbin, Co. Down. Graduated Edinburgh, December 15th, 1908. Died March 3rd, 1949.

Laine, Eustace John, M.C., M.R.C.V.S., Capt. R.A.V.C. (T.A. Res.), Bon Air, Queen's Road, Guernsey. Graduated London, April 18th, 1912. Died March 7th, 1949; aged 57 years.

A tribute to Capt. Eustace Lainé, whose death we record with much regret, will appear in an early issue.

Mason, Robert, Glebe House, Felixkirk, Thirsk, Yorks. Graduated Glasgow, May 22nd, 1893. Died July 29th, 1948. (Recent notification).

Tatam, W. J., C.M.G., C.B.E., Col. A.V.S. (retd.). Graduated N. Edinburgh, May 23rd, 1888. Died January 15th, 1949. (Information just received.)

* * * * *

GENERAL OBITUARY

Montefiore, Albert Samuel Falk, Final Year Student of the Royal Veterinary College, at Streatley, Berks., on March 4th, 1949; aged 29 years.

* * * * *

INFERTILITY AND S.19 VACCINE

President, N.V.M.A., Replies to Complaints in the Farming Press

"In your issue of January 18th (p. 139) I see that doubts are creeping in about the usefulness of the S.19 vaccine," writes Mr. J. R. Crooks, of West Ella Grange, Anlaby, Hull, in the issue of *The Farmer and Stock-Breeder* of February 15th and continues: "Maybe my results would interest you. Three years ago I had over 70 head of female stock vaccinated—all ages from four months to cows; it did not cure abortion, it only cured the females of having calves at all. It has, in fact, taken from then until now to get a few, very few indeed, in calf; in all, it has cost me over £2,000 direct loss.

"I have made it my business, in attending various markets, etc., to ask as many people as possible their opinion of the vaccine and the results they have obtained. Many of their remarks cannot be repeated, but some are satisfied.

"Further enquiry has brought to light a rather curious fact: S.19 vaccine, supplied by the Weybridge Ministry of Agriculture Station, seems to be at fault; vaccine by private firms has given very good results. I have also been given to understand that some consignments of Weybridge vaccine were withdrawn as 'not satisfactory.' It would be interesting to know why farmers who had used this material were not notified so that they could take action to minimise their loss."

In the same periodical, on March 1st, Mr. J. K. Winser, of Weston Farm, Petersfield, Hants, observes: "We were extremely interested to see the letter on S.19 Vaccine (February 15th, p. 407). Our predecessors used a live vaccine in 1938-39 as a precaution, and we had a spell of unexplained infertility lasting about two years.

"After two years' normal breeding, relying on official advice, we used S.19 on all calves at six months and all dairy cows as they became empty. This was followed by extremely shy breeding, despite every known veterinary treatment, and about 50 per cent. of the herd, including heifers, had to be sold out permanently barren; the remainder were slowly improving.

"Unfortunately, six fresh cows were brought in last summer and again S.19 was used; it is still uncertain if any of these are in calf. We have never had a case of abortion. There has been no noticeable difference in feeding during the good or bad periods.

"It is time for a proper and wholly independent survey of herds known to have sub-normal conception rates. Only by accurate statistical methods will it be possible to sort out this problem which is costing the dairyman vast sums every year.

"It is difficult to stop using live vaccine once it has been used on a herd, and the Ministry, having started this trouble, should be a little more concerned and show greater activity in trying to put matters right."

The issue of March 15th contained the following letter from Dr. R. F. Montgomerie, President, N.V.M.A.:—

"Ever since the introduction of S.19 vaccine the Ministry of Agriculture has paid particular attention to its safety in use, and has investigated many claims that it has been the cause of sterility. In not a single instance, we are informed, has it been shown that S.19 was to blame.

"The Ministry states that no batch of S.19 has ever had to be withdrawn other than for the routine reason that it had reached its 'expiry date.' This has to do with the keeping qualities, and has much the same significance as the date on the carton of a photographic film.

"Both the Ministry and my Association are entirely satisfied that S.19 vaccine does not cause sterility; and that on the contrary it should be used on an ever-increasing scale in the control of contagious abortion. It would be most unfortunate if the letters printed in your issues of February 15th and March 1st should discourage the use of this invaluable product."

* * * * *

CENTRAL VETERINARY SOCIETY'S ONE-DAY POULTRY COURSE

We would commend to the attention of all those of our readers to whom attendance is possible, particulars of the one-day poultry course for veterinary practitioners which are given in our Notices Column. This course, which is being held by kind permission of the Principal, at the Royal Veterinary College on April 12th, has been arranged by the Central Veterinary Society at the request of the N.V.M.A. The speakers and demonstrations will be "in order of their appearance," Dr. R. F. Gordon, Mr. J. D. Blaxland, Mr. T. M. Doyle, Mr. Norman Dobson and Mr. C. Horton Smith. A film also will be shown. Lunch will be provided in the College Refectory.

* * * * *

ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Sheep Scab:

Yorks. W.R.—Stonehead Farm, Lower and High Coppy Farm, Moss Bar Farm, Cowling, Keighley (Mar. 7th); Kitchen Farm, Harden, Black Lane Ends, Colne, Lancs. (Mar. 8th).

* * * * *

The offices of the Institute of Meat are now situated at Bristol House, 19/20, Holborn Viaduct, London, E.C.1.

Antrycide

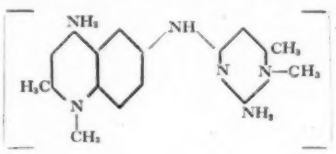
As recorded in our issue of January 8th, the Colonial Office and Imperial Chemical Industries, on December 29th last, made a joint announcement concerning the successful synthesis of this new therapeutic agent against trypanosomiasis. Antrycide has been considered by the International Scientific Committee for Trypanosomiasis Research, which held its first meeting in London recently.

In its issue of January 15th, *Nature* prints the following contribution on the new trypanocidal drug, by (the late) Dr. F. H. S. Curd and Dr. D. G. Davey, of the Manchester Research Laboratories of I.C.I.

The discovery of a new drug, "Antrycide,"* showing great promise in comprehensive field trials as a trypanocide, has already been referred to in an announcement from the Colonial Office. This new drug resulted from a systematic study of the chemo-therapy of trypanosomiasis in these laboratories, and although a full account of our researches must await later publication, a few preliminary observations may be of interest.

After considerable chemical exploration, 4-amino-6-(2′-amino-6′-methylpyrimidyl-4′-amino) quinaldine-1 : 1′-dimetho salts were found to possess outstanding trypanocidal properties against laboratory infections.

These salts, which have the accompanying formula, will be referred to for convenience as "Antrycide" salts.



We give in Table I a brief summary of the experimental findings obtained with one of these salts in the treatment of various trypanosome infections in mice; in all experiments the drug was administered subcutaneously.

"Antrycide" salts also possess marked prophylactic action against experimental trypanosome infections. Mice, rats and rabbits were first treated with the drug, and then after a varying period of time were "challenged" with trypanosomes. It was found that, with suitable doses, the animals could be protected against infection for some weeks. The results of some typical experiments with *T. congolense* (Busimbi strain) in mice are recorded in Table II. If no trypanosomes were to be found in the blood 28 days after challenging, then the animals were regarded as completely protected (P in Table II). Incomplete protection (I) was judged by delayed death as compared with untreated control animals or by the appearance of trypanosomes in the blood of the test animal before completion of the experiment.

Table II

Prophylactic Experiments in Mice Infected with *T. congolense* (Busimbi) using "Antrycide" Chloride

Dose (mgm./kgm.)	Interval between dosing and challenging (days)	Result
25	14	10/10 P
12·5	14	8/8 P
5	14	4/11 P. 7/11 I
25	28	8/8 P
12·5	28	8/8 P
5	28	8/8 I
12·5	42	2/6 P. 4/6 I
5	42	8/8 I

Our laboratory results appeared to us to justify field trials, and in association with the Tsetse Fly and Trypanosomiasis Committee of the Colonial Office, and with the Sudan Government, veterinary trials were commenced in Africa. Although these trials are still incomplete, the evidence already available shows that "Antrycide" salts may be administered subcutaneously with ease and safety and, in single doses, have cured infections of *T. congolense*, *T. vivax* and *T. brucei* in cattle, *T. brucei* in horses, donkeys and dogs and *T. evansi* in camels. "Antrycide" salts have also been shown by us to give considerable protection to cattle against subsequent infection with *T. congolense* and *T. vivax*. Experiments are still in progress to determine the duration and the character of this prophylactic action, and to ascertain whether the drugs can be used successfully for the protection of cattle maintained in or transported through tsetse areas of tropical Africa. The good correlation obtained so far between laboratory and field results encourages us to expect prophylactic effects of importance.

Table I

Trypanocidal Action of "Antrycide" Chloride against various *Trypanosoma* Species

Dose (mgm./kgm.)	*T. rhodesiense* (Tinde)	*T. brucei* (Liverpool)	*T. congolense* (Busimbi)	*T. evansi* (India)	*T. evansi* (Sudan)	*T. equiperdum*	*T. equinum*
25	C						
12·5	C						
5	C	C and R					
2·5		R		C	C and R		C
1·25			C	C	C and R	C	C
1·0			C				
0·5			C and R	C and R	R	C	C and R
0·25			R			C and R	
0·125			R and DD				

C = Cure : blood freed from trypanosomes for 28 days. R = Relapse : blood freed from trypanosomes temporarily, appearing again within 28 days. DD = Delayed death : blood not freed from trypanosomes

Against a *Trypanosoma congolense* infection, a single dose of 1 mgm. of "Antrycide" chloride per kg. body-weight was curative. Half this dose effected a proportion of cures. Similarly, activity was shown by this compound against many other experimental trypanosome infections, for example, against those due to *T. rhodesiense*, *T. brucei*, *T. evansi* (India), *T. evansi* (Sudan), *T. equiperdum* and *T. equinum*. Susceptibility to the drug of the different trypanosome species was not uniform throughout the series, but by adjustment of the dose, cures could be obtained in every case. We did not encounter marked toxic effects even with doses many times those necessary for cure.

It should be noted that the figures in Table I relate to particular strains of the trypanosome species indicated. Some variation was experienced with certain other strains; for example, one strain of *T. congolense*, isolated in Kenya, showed marked resistance compared with the Busimbi strain, and a dose of about 2·5 mgm./kgm. was required to produce consistent cures in mice.

* Trade mark of Imperial Chemical (Pharmaceuticals), Ltd.

* * * * *

The King has granted a free pardon and remission of 7s. 6d. fine to Hugh John Williams, Red Lion Farm, Llanllechid, Bangor, Caernarvon, who was last August convicted of keeping a dog without a licence. It was afterwards found that he had been granted exemption as a farmer.

* * * * *

A horse belonging to Mr. J. Harrison, Hudswell, Yorkshire, which has completed 40 years' service, can still do a good day's work, reports the *Farmer and Stock-Breeder*.

Scottish Metropolitan Divisional Emblem

MATHESON MEMORIAL SHIELD

There is inevitably an element of sadness in the completion, as a memorial to him, of a project which its originator had so keenly at heart in the provision of an emblem worthy to symbolise the purpose and dignity of his local professional Association. Appreciation of the conception and its motive, however, and of its loving accomplishment by his wife, was uppermost in the minds of all present at the annual general meeting of the Scottish Metropolitan Division on Wednesday, February 23rd, 1949, when an "emblem" was presented to the Division on behalf of Mrs. Mary B. Matheson in fulfilment of a wish expressed by her late husband Professor D. C. Matheson. The presentation was made on Mrs. Matheson's behalf by Professor G. F. Boddie and gratefully acknowledged on behalf of the Division by the President, Professor A. Robertson.

NATIONAL VETERINARY MEDICAL ASSOCIATION OF GREAT BRITAIN AND IRELAND
TO PREVENT DISEASE
TO RELIEVE SUFFERING
TO RESTORE USEFULNESS
DOMINE DIRIGE NOS
SCOTTISH METROPOLITAN DIVISION

Professor BODDIE said that Mrs. Matheson had asked that on her behalf he should present that emblem to the Scottish Metropolitan Division. Many of them would recollect that not long before his death Professor Matheson spoke of the value he felt there would be in the Division possessing a concrete symbol of its dignity and aspirations. Professor Matheson used the word "emblem" to describe the object he had in mind and the word did seem to convey the purpose he had outlined. Professor Matheson had prepared some sketches of the form he thought this emblem might take. Mrs. Matheson shared her husband's thoughts on this subject and last summer she offered to present a shield in memory of her husband, an offer which the Division welcomed very cordially. "Mrs. Matheson has told our Secretary," proceeded Professor Boddie, "that her husband placed a high value on the work done by this Division and that in some measure this shield is to be regarded as a token of the affection Professor Matheson had for our Division of the 'National.'

"Those of you who knew Professor Matheson will remember the inner strength that he possessed. That strength arose from an inborn spirituality which sometimes found expression in a desire for some tangible object that would either convey or act as a reminder of an unspoken thought. Mrs. Matheson not only has a sympathetic understanding of her husband's thoughts leading to the proposal that this Division should have an emblem but she also possesses those artistic qualities which have enabled her to reproduce these thoughts in a form that I think you will all agree is possessed of rare beauty. The Division is greatly indebted to Mrs. Matheson for so carrying out her husband's wishes and I am sure the Division will wish to convey to her their very deep appreciation, not only for this beautiful emblem but also for the remembrance it carries of many years of faithful service given by Professor Matheson to this Division. When this shield is exhibited at our meetings we will not only remember the donors but will also remember the example set by our former colleague.

"I do not know if any of us had a very clear understanding of just what thoughts Professor Matheson wished to convey to us in the emblem, but somehow it does seem that Mrs. Matheson has succeeded in conveying her husband's message with a clarity that is as wonderful as it is beautiful.

"Let us look at the emblem for a moment. The base of oak is the very symbol of strength and endurance, two qualities that surely have their foundation on faith. On a background of sky-blue there is set a silver cross, the lodestar of human ideals that persist so long as there is hope. 'Girt about with two thistles' we have a reminder of the country in which this is the Metropolitan Division. Inscribed below are four mottoes epitomising our professional purpose:—To Prevent Disease: To Relieve Suffering: To Restore Usefulness: *Domine Dirige Nos*—surely an apt reminder of the charity that inspires our professional endeavours.

"So Mr. President I hope you will feel that in this act of presentation and acceptance there is an element of dedication, for it seems the emblem tells again the message of those age-old words that have been a comfort to so many—'Now abideth faith, hope and charity, these three.'"

He asked the President, on behalf of Mrs. Matheson, to accept that emblem in memory of her husband—"an emblem for you and your successors to hold and to cherish."

Professor ROBERTSON spoke of the occasion as indeed unique, for he knew of no other Division which had such an emblem: he regarded it as a great privilege to have the opportunity of accepting it on behalf of the Division. He had experience as hon. secretary a few years ago of working in co-operation with Professor Matheson in his capacity of president, and although during his term of office there were many good presidents, he could say in all sincerity that none showed more keen interest in the welfare of the Division or more energy in furthering its reputation than did Professor Matheson. The emblem they had before them that day—though he unfortunately did not live to see it—was in itself a witness to the thought he gave to the Division and its affairs.

"While listening to Professor Boddie's remarks," Professor Robertson continued, "I was reminded of the old saying:

'Sow a thought and reap an action,
Sow an action, reap a habit,
Sow a habit, reap a character,
Sow a character, reap a destiny.'

"Professor Matheson's thought has, through the generosity and enthusiasm of Mrs. Matheson, been translated into action and has to-day come to fruition.

"If Professor Matheson's wishes be respected, as of course, they will, its presence at meetings will become the habit. And if the message it keeps in front of us be followed, it cannot but affect the character of our meetings—and who can say what influence that may have on the destiny of this Division and of its members. I have the utmost pleasure, therefore, in accepting this emblem on behalf of the Division, to have with us always at our meetings both as a reminder of the past and as an inspiration for the future."

On their behalf he would like to express their heartfelt appreciation of Mrs. Matheson's generous gesture and at the same time their thanks to Professor Boddie as mediator in its expression.

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INDIAN DRUG RESEARCH INSTITUTE

"Nearly 35 per cent. of the vegetable drugs listed in the *British Pharmacopoeia* are native to India, and substitutes for several others can be found among the rich and varied flora of that vast country," states *The Lancet* in a recent issue and continues: "These resources have not been fully explored and exploited; and for some time the need had been felt for a central organisation to achieve this object. Early this year the Board of Scientific and Industrial Research decided to set up in Lucknow a Central Institute for Drug Research. In the short term, the accent will be on natural drugs, but gradually research in the fields of synthetics and antibiotics will be intensified. The institute will perform five related functions: (1) promotion of drug research in general, including botanical, chemical, pharmacological, bacteriological, microbiological, and clinical aspects; (2) testing and standardisation of drugs, and tendering expert opinion thereon as a guide for further research,

development, and production; (3) offering facilities to, and helping, scientists in universities, special institutions, and industrial concerns, and others who may not be in a position to carry out investigations by themselves; (4) providing controlled clinical trials; and (5) dissemination of scientific knowledge and statistical information relating to drugs.

"The institute is expected to work in close harmony with the National Chemical Laboratory at Poona. It will have a director, four assistant directors in charge of the principal divisions, and fifty technicians, apart from a number of research scholars."

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

SODIUM FLUORIDE FOR ROUND WORM IN PIGS

Sir,—We have so far found sodium fluoride to be an effective drug for the removal of the large round worm in pigs. We did find that 1 per cent. of the drug added to the dry meal was effective and had a useful margin of safety.

However, potatoes and swill form part of the diet of pigs on many farms, so medication based on a percentage of dry meal fed was not always convenient or satisfactory. In such cases we have found the scale of dosage, given in the N.V.M.A. handbook "The Husbandry and Diseases of Pigs," and based on the Australian investigations, effective and safe.

At this level, *i.e.*, 0·1 to 0·15 grammes of commercial sodium fluoride, we have dosed pigs of different weights and we have not observed any vomiting or other toxic effects. Consumption of the medicated food is reduced by about 50 per cent. However, no other food is offered until the medicated food has all been consumed.

Our experience confirms the fact that in sodium fluoride we have a reliable, safe and convenient anthelmintic for removing the large round worm in the pig.

Yours faithfully,
D. Luke.
W. A. M. Gordon.

Veterinary Research Division,
The Farm, Stormont, Belfast.
March 9th, 1949.

* * * * *

NIGHT VETERINARY SERVICES IN THE METROPOLITAN AREA

Sir,—When I commenced to practise my profession in 1914, I inherited certain rules of conduct which had been rigidly enforced upon me by my father who had also inherited them from his father. One of these was, that whatever the hour of the day or night, it was the veterinary surgeon's duty to place himself at the disposal of his clients.

Until I left general practice in 1946, I endeavoured to carry out what I regarded as an elementary, if irksome, rule of conduct. It was, therefore, with some astonishment that I discovered that in the Metropolitan area and the ring of inner suburbs of London, it was the apparent custom of veterinary surgeons to shut down somewhere in the neighbourhood of 6 p.m. and they were no longer available until the following morning to their clients.

I made public allusion to this at Headquarters, N.V.M.A. and I believe a letter on the subject expressing the concern of the officials of the N.V.M.A. reached the Central Veterinary Society. I do not know what was the outcome of this, but I was given to understand unofficially, that some sort of roster system was being arranged for Metropolitan practitioners so that a certain percentage of veterinary surgeons would be available for night work in London. But so far there has not been any improvement in the position. In fact so bad did it remain, that arrangements had to be made at Headquarters, R.S.P.C.A. for a night ambulance service to render first aid to accident cases and other emergencies.

To aid this service, veterinary surgeons were circularised and I was pleased to note that no less than 30 consented to attend to emergency calls by our night staff. Within a few weeks, it became apparent that these promises were ephemeral. Night after night our devoted staff rang these veterinary surgeons for their services and got no reply. This not only causes irritation to us, but is most damaging to the reputation of the veterinary profession, both with private individuals and public bodies who are at a loss to understand why this extraordinary situation is allowed to continue.

Let me give you an instance by no means unusual in the records of the R.S.P.C.A. when help was needed in the London area: On the evening of February 24th, when we were urgently in need of veterinary attention to animals at London Airport, no less than 14 veterinary surgeons were rung up with no result. Four of these were out on their rounds and it was stated that they could not be contacted. Two were ill, and from eight there was no reply whatever.

I think, Sir, this example is sufficient to indicate the urgent need for improvements in the night services offered by the veterinary profession in the Metropolitan area.

Yours faithfully,
R. C. G. Hancock.

Royal Society for the Prevention of Cruelty to Animals,
105, Jermyn Street,
London, S.W.1.
March 10th, 1949.

* * * * *

THE "OPEN" COLUMN

Conditions of Employment of Veterinary Assistants

Sir,—Two points would seem to emerge from the President's letter in your issue of March 5th.

First, that the Council of the N.V.M.A. regard the Supplement as of a confidential nature, and second that the subject of conditions of employment of veterinary assistants is one that should be treated with secrecy by members of the Association.

To discuss this first point, by virtue of the technical nature of its subject matter, *The Veterinary Record* is, for all practical purposes, restricted to members of the profession and veterinary students. The majority of the former are members of the N.V.M.A. and so receive the Supplement. The latter group is the only one which would read the *Record* and yet not have official access to the Supplement. Thus unless this latter group is the one from which it is desired to keep any information, the *Record* is as confidential as anything printed in the Supplement.

Personally, I have always regarded the Supplement as being more a convenient method of reporting meetings of Council and local societies, rather than a confidential document.

I would like to remind members that we are a collection of men and women bound together by membership of a common profession—not a secret society. While our affairs are of little interest to the majority of laymen, this does not mean that laymen should be excluded from knowledge of these affairs.

With regard to the second point—that the particular subject of conditions of employment of veterinary assistants is one that should be treated in confidence by members of the N.V.M.A., may I ask who it is we are attempting to exclude from any knowledge of these discussions? The only group affected is that of the veterinary students, and I fail to see why they should be banned from knowledge of discussions on a matter so vitally affecting their future interests. I know that the President refers to "grounds which it would be a breach of both taste and confidence to refer to here," but I have always been a trifle sceptical of reasons which cannot be discussed.

Thus: (1) I fail to see that the subject of conditions of employment of veterinary assistants is one that merits any degree of secrecy.

(2) If for some undisclosed reason any secrecy should be necessary, this is not obtained by confining the subject to the Supplement.

(3) The only result of such restriction is to prevent week by week discussion of this subject and so tend to suppress discussion that might be distasteful to certain established members of the profession.

May I suggest that in view of these facts the Council reverse their decision and allow free discussion of this subject in the "open" columns of the *Record*.

Yours faithfully,
R. W. M. Gover.

Moordown Guest House,
Stuart Road,
Highcliffe-on-Sea,
Hants.
March 5th, 1949.

. . . . . .

Sir,—Mr. Gover has given a very accurate description of the views of those members who feel that conditions of employment of assistants should be discussed in the correspondence columns of the *Record*. The President has given a clear account of the attitude of Council, N.V.M.A.

The members who share Mr. Gover's opinions are considerable in number but, in the main, they are unable to attend divisional meetings. Consequently, their only medium of expression has been through the correspondence columns of the *Record*. They feel that this medium, once fully open to them, is now partly to be closed. The Supplement, which is published only a few times a year, cannot be regarded as a satisfactory substitute, and their sense of frustration is aggravated by the fact that the officers of the Association have made no reply to those letters published in the latest issue.

Would it be possible for the *Record* to publish a supplement every week as is done by the *British Medical Journal*? This supplement need only consist of a few pages containing items of a more confidential nature, political correspondence, etc. It could be issued to all members while its issue to non-members could be left to the discretion of the N.V.M.A. Although objections can be raised to this suggestion, I would ask the President and Council to give it full and immediate consideration as the temporary inconvenience it may cause will, I feel sure, be repaid by a more united profession.

Yours faithfully,

40, Cholmeley Park, Highgate, N.6. H. Williams Smith.

March 5th, 1949.

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R.C.V.S. COUNCIL ELECTION

Sir,—It is with great regret that I see no member of the Ministry's permanent staff amongst the list of nominees as candidates for the election. As time goes on we all become more and more connected with the Ministry and if ever we are nationalised we shall be entirely under it.

Perhaps it is now too late for any of those to whom I refer to come forward and contest the election, so may I suggest that the new Council co-opt two members on their Council from the Ministry's permanent staff—one from the Field Division and one from the Research Division—but both to be nominated by their Association.

Yours faithfully,

Eastwick House, Evesham, Worcs. G. C. Lancaster.

March 6th, 1949.

* * * * *

"HUMANE" KILLING AND MUSLIM METHOD OF SLAUGHTER

Sir,—I am pleased to learn from Aftabud Din Ahmad's letter under the above heading in your issue of March 12th that "meat coming from humane killing in England is eatable for a Muslim." It would thus appear that, as far as Muslims are concerned, there would be no grave objection to my contention that the Slaughter of Animals Act should be amended to give all cattle killed in Britain the benefit of mechanical stunning prior to bleeding.

This was the reason for my original letter and, as this point is now conceded, there appears to be no need—as far as Muslims are concerned—to protract the argument.

I will readily agree that under exceptional circumstances, in some remote parts of the world, it would be unreasonable to attempt to argue that the provisions of the Slaughter of Animals Act should apply. I would point out that my contention is, and always has been, concerned with animals slaughtered in Great Britain. It would be presumptuous on my part to contend that the laws of Britain should be forced on other countries. That is their prerogative alone and as long as they do not directly affect us we have no right to interfere, however much we disagree, with their internal affairs.

I must correct the statement with regard to the slaughter of pigs in British bacon factories, that pigs are slaughtered by the Jewish *cum* Muslim method. This is not so. Pigs are normally stunned by the electrical method in which bleeding is as perfect as it is possible to achieve.

Your correspondent is sadly ignorant concerning the properties of blood and is incorrect in assuming that we accept the view that it is harmful as a food. No such views are held, in this or other Christian lands, by any of our scientists. Indeed the exactly opposite view is held. Blood was regarded by the ancients as the location of the spirit and Moses said "It is the life." The objections to blood as a food are entirely religious and aesthetic, not scientific. Badly bled meat is liable to decompose more quickly than well bled meat for bacteria more readily multiply in badly bled meat than in well bled meat. It is impossible to have meat entirely devoid of blood and any person who eats meat, by whatever method of slaughter, must consume some blood.

I have in previous letters given my reasons for questioning certain evidence in support of ritual slaughter, but Aftabud Din Ahmad's "simple logic" that slaughter by a sharp knife must be a quicker method of ending life, side-steps the real issue which is loss of consciousness during slaughter.

Yours faithfully,

Essex House, High Street, Stratford, E.15. H. E. Bywater.

March 14th, 1949.

A.V.S. ANNUAL EASTER CONFERENCE

Sir,—In view of the fact that A.V.S. has previously been mentioned in your columns only in connection with Assistants' working conditions, we should be most grateful if you would give us the opportunity to show that our activities are by no means confined to this question.

For the first time, the A.V.S. is staging an Inter-Veterinary College Rugger Knock-out Competition, coincident with its Annual Easter Conference in Liverpool. A trophy for this competition which will be held each year, is being established by the N.V.M.A.

We feel that some of your readers may be interested in the conference which takes place on March 26th to 29th. It will be opened by Mr. J. O. L. King, M.R.C.V.S., B.SC. (President of Liverpool University Veterinary Society), and will include an address by Professor A. N. Worden on behalf of the Universities Federation of Animal Welfare and papers of student interest presented by respective college delegates. The Conference will close with organised visits to Evans Pharmaceutical Laboratories and the University Veterinary Field Station.

Yours faithfully,

Association of Veterinary Students, School of Veterinary Science, Bedford Street North, Liverpool, 7. G. Leam (*Hon. Secretary, A.V.S.*).

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BACTERIOLOGICAL SECTIONS AND FILMS

Sir,—I should be most grateful if any laboratory, college, etc., in your country could, for payment or *gratis*, assist us to meet our need for the following sections and for slides:

Sections showing *Actinomyces ligneiresi* (4), Negri-Bodies (4), *Actinomyces bovis* (4), *Mycobacterium tuberculosis* (4), *M. paratuberculosis* (4), Koch's Blue Bodies (4).

Films showing *Babesia bigemina* (4), *B. bovis* (4), *B. canis* (4), *B. gibsoni* (4), *B. equi* (4), *B. caballi* (4), *Theileria parva* (2), *Trichomonas foetus* (4), *Anaplasma marginale* (12), *Bacillus anthracis* (12), *Past. boviseptica* (12), *Past. aviseptica* (12), *Trypanosoma evansi* (12), *T. equiperdum* (12).

Yours faithfully,

Tej Singh, Capt. I.R.V.F.C., Comdg. No 1 Command Veterinary Laboratory, Lucknow.

March 6th, 1949.

DISEASES OF ANIMALS ACTS, 1894 TO 1937, AND AGRICULTURE ACT, 1937 (PART IV).

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Fowl Pest	Parasitic Mange*	Sheep Scab	Swine Fever
Feb. 16th to 28th, 1949	4	4	15	—	3	1
Corresponding period in—						
1948	5	—	27	—	1	1
1947	1	14	1	1	—	2
1946	3	—	—	—	8	22
Jan. 1st to Feb. 28th, 1949	28	5	87	—	13	4
Corresponding period in—						
1948	21	—	95	1	16	5
1947	10	63	1	1	13	10
1946	21	17	—	4	24	112

Note.—The figures for the current year are approximate only.
* Excluding outbreaks in Army Horses.

Tuberculosis (Attested Herds) Schemes

The number of Attested Herds, *i.e.*, herds officially certified as free from Tuberculosis as at February 28th, 1949, was as follows:—

England	Wales	Scotland	Total (Great Britain)
13,538	12,519	11,283	37,340